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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

SEPTEMBER 1956

AGRICULTURAL ECONOMICS

Section c: Land Economics

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Prepared primarily for the use of workers in agricultural
research in the subject-matter areas presented.

Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

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FOREWORD

This compilation is one of a series providing information on agricultural research at the State Agricultural Experiment Stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State Agricultural Experiment Stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project (if several States are working cooperatively). Most of the regional and a number of individual State projects involve cooperation with various agencies of the USDA. For cooperative projects between the United States Department of Agriculture and State Stations, consult the summary of research projects reported by the Central Project Office. Because of diverse interest and in order to provide appropriate reference, certain projects are listed in more than one subject field.

The relevant regional projects and the titles of the contributing State projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC- North Central, NE- Northeastern, S- Southern and W- Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

Agricultural Economics projects are classified on the basis of fairly distinct areas or divisions of subject matter. These have been developed over time and are generally recognized by professional workers in this field of research. The research projects in Part 2 are presented in four sections. The other sections and the main area of content are as follows:

- Section a - Prices, Incomes, and General Studies of Commodities and Industries
- b - Farm Management
- d - Farm Finance and Taxation

In each section the projects are grouped according to segments of the entire field as indicated in the "Contents." This should prove helpful in understanding readily the segments identified with each major area of the field of agricultural economics and the relative emphasis being given to each segment.

Inquires regarding specific projects may be addressed to the Director of the station where the research is being conducted.

LAND POLICY AND PROGRAMS

- Colo. Economic Effect of Ground-water Laws and Related Institutions on Ground-water Use in the Lower Bijou Basin, Morgan County, Colorado. To (1) study judicial interpretations and rules laid down in Supreme Court and District Court decisions, with reference to possible economic effects on ground-water development for agriculture in Lower Bijou Basin; and (2) evaluate economic implications of alternative legislative means of controlling use of an inadequate ground-water supply.
Agr. Econ., Civil Engin. 236 (W-42)
- Mont. Economic Problems of Irrigation Development and Income Potentialities of Farming in Areas to be Irrigated. To (1) determine agricultural potentials under irrigation of areas proposed for development; and (2) analyze problems of developing irrigated farming from dry lands.
Agr. Econ. 102 M. S. 862
- N. Mex. An Analysis of Ground-water Laws, and Related Institutions As They Affect the Economy of Lea County, New Mexico. To (1) inventory ground-water laws and administrative judicial decisions applying to Lea County; (2) evaluate experiences and decisions with ground-water laws as affecting economy of county; and (3) estimate and evaluate probable future economic effects of present ground-water laws and decisions on Lea County.
Agr. Econ. 59 (W-42)
- Utah Economic Effects of Ground-water Laws and Related Institutions in Cache County, Utah. To (1) inventory and evaluate experiences in Utah with ground-water laws and institutions as they might apply to drainage and development of underground water for irrigation in Cache County; and (2) determine and evaluate nature and extent of (a) favorable changes in agricultural production that might result from lowering level of ground-water by wells and using water for irrigation, and (b) unfavorable changes in agricultural production and domestic water supplies that might result from lowering level of ground water
Agr. Econ. 485 (W-42)
- Wash. Settlement Progress Under New Irrigation Development in the Columbia Basin. To learn (1) present level of farm capital investment and indebtedness, growth in operator's net worth since settlement, and extent and manner in which farm resources have been developed to date for different land types, sizes, and types of

of

farm tenure; (2) current level/costs incurred in resource development and current level of costs and returns in operating under new irrigation for: (a) different rates employed in farm resource development; (b) different degrees of total farm resources developed; and (c) for different land types, sizes and types of farms, and tenure situations; (3) personal characteristics and qualifications needed for successful settlement of new irrigated farms as: (a) relationship between social and psychological characteristics of settlers and progress made in settlement; (b) determine set of objective criteria to help settlers decide if they want and are qualified for settlement of new irrigated farm; (c) test and validate "Self-Inventory for Prospective Settlers" by adjustment to, and success at developing new irrigated farms; and (4) develop research program related to agricultural development in Columbia basin.

Agr. Econ., Rur. Sociol. 1236

PUBLIC LANDS, THEIR USE, MANAGEMENT
AND THE POLICIES AFFECTING THEM

Mass.

Public Land Ownership in Rural Areas of Massachusetts. To (1) determine character and extent of public land ownership in rural areas of Massachusetts; (2) analyze types of land uses developed on rural lands in public ownership; (3) study effect of public land ownership on economic and social structure in lands most affected; (4) appraise effect of public land ownership in rural areas on local farming population and agriculture in general; (5) determine extent to which public ownership promotes conservation of land resources; and (6) indicate patterns of public land ownership in rural areas of Massachusetts serving best interests of general public and of farming population of the State.

Econ. 300

Wis.

Agricultural and Recreational Potentials in the Menominee Indian Reservation. To (1) inventory and evaluate economic resources of reservation, especially agricultural and recreational industries; (2) appraise income and employment opportunities in resource development, and estimate capital requirements and needs for technological and managerial skills; (3) define alternative forms of economic organization and analyze their advantages and disadvantages from tribal and individual viewpoint; and (4) assist in development of a land tenure system.

Agr. Econ. 982

LAND AND WATER UTILIZATION

- Calif. Economic and Social Aspects of Utilizing Ground Water in California. To (1) understand economic implications of difficulties in using ground water in several ground-water basins; (2) study historical development of difficulties and economic and social causes and effects; (3) study various attempts made to overcome difficulties; (4) understand results for failure or success of attempts; and (5) explore whether and how institutional mechanisms now governing use of ground water could be improved.
For., Irrig., Soils 1406
- Fla. An Analysis of Present and Potential Utilization of Land for Grazing and Alternative Uses in Central Florida. To determine types and intensities of pasture development and land use which appear feasible in Central Florida.
Agr. Econ. 619
- Kans. The Development of an Agricultural Land-Use Program for the State of Kansas. To assemble and analyze all available information pertinent to the agricultural and related problems of the various counties of the State as a basis for the adjustments needed and methods to be followed in developing an effective and integrated land-use program for these counties.
Agr. Econ. 215
- Mont. Small Water Project Development as Carried on by the Montana Water Conservation Board. To collect, tabulate, and analyze data on activities of Montana Water Conservation Board as basis for: (1) measuring accomplishments of this method of developing small water projects; (2) considering adequacy of type of State agency; (3) providing information which may clarify issues for other States and the Federal Government in policies on small water developments; (4) studying relation of State developed water projects to basin development programs; and (5) defining field of "small water project development."
Agr. Econ. 109 M. S. 879
- Okla. An Economic Study of Subsurface Water Resources and Development for Irrigation on Oklahoma Farms.-- Phase 1. To develop comprehensive inventory of quantity and quality of water resources for irrigation. Phase 2. To (1) measure significance to agriculture of water resource development for irrigation on: (a) physical organization and operations of the farm businesses; (b) costs, returns and net income; (c) stabilization of the business; and (2) learn physical, economic and institutional limitations to water resource use and development for purposes of irrigation.
Agr. Econ. 891

Utah An Economic Analysis of Land Use Changes Along the Wasatch Front. To (1) ascertain extent of encroachment of industrial and residential use of agricultural land; (2) evaluate actual economic loss to agriculture with what it might have been under different and assumed conditions of development; (3) evaluate effects of rural zoning ordinances on changes in agriculture; and (4) determine maladjustment in tax structure and other adverse affects of changes on agriculture.

Agr. Econ. 403

Va. Economic Classification of Land with Special Reference to Use. To make an inventory of the land resources of a limited number of typical farming areas of Virginia with the specific purpose of dividing the land into classes according to the intensity of use to which such classes are adapted.

Agr. Econ. 86001

Wyo. Land Classification and Valuation Based on Soils, Topography, Precipitation, Input, Gross, and Net Returns. To determine (1) which lands in dry land areas will give more profitable returns from cultivated crops; (2) beneficial effects of grass mixtures and pasture versus alfalfa and hay on soil fertility and net income per acre on irrigated projects; (3) net income from grass meadows versus cash crop lands on irrigation projects; and (4) approximate yield of wheat per acre when animal carrying capacity is known and the topography of soil is favorable for farming.

Agr. Econ. 499

SOIL AND WATER CONSERVATION

Iowa Physical and Economic Analysis of Watersheds as Related to Soil and Water Conservation. To (1) establish benchmarks of physical and economic conditions in a particular watershed to measure physical and economic changes; (2) develop methods to extend findings in test watershed to other watersheds in the State; (3) measure consequences of various land use practices, structures, etc., as to runoff, erosion, land productivity and soil moisture; (4) develop alternative physical means to achieve watershed objectives and appraise various measures for cost and benefits to watershed and to component beneficiaries and contributors; (5) develop physical and economic criteria for assessing costs among land owners, private interests and public agencies, and to evaluate damages from watershed development; and (6) develop and appraise alternative means to share benefits and costs.

Agr. Econ., Soils, Engin. 1266

S. Dak. Economics of Soil Conservation on South Dakota Farms and Ranches. To determine to what extent, under various conditions, it is economically feasible for individual farmers to (1) substitute various legumes and grasses for row and small grain crops; (2) build various soil conserving structures such as terraces, grass waterways, dams, etc.; and (3) adopt other conservation practices such as contour plowing, planting, strip cropping, etc.
Agr. Econ. 211

LAND VALUES AND PRICES

Ark. Arkansas Land Values. To (1) study trends in land prices and appraise effects of these prices in terms of farmer purchases of land; (2) determine types of buyers and effect of their purchases on ownership of land; (3) determine methods by which land is sold with special attention to use of credit, credit agencies, and problems associated with credit purchases; and (4) appraise overall land price trends in terms of tenure changes, adjustments in size of operating units and mortgage arrangements.
Rur. Econ. & Sociol. 356

Ky. A Study of Farm Values and Trends. To study (1) farm values in representative agricultural areas; (2) trends of such values in terms of normal production value of farms as well as sale values; and (3) fundamental factors underlying farm values.
Agr. Econ. 14

Mo. Real Estate Price and Assessment Trends. To (1) keep record of land price trends in major type-of-farming areas of State and make data available to land owners, buyers, borrowers, and lenders; (2) compare valuation of land for tax purposes with legal framework outlining assessment procedures; (3) learn if practices result in equitable assessment within counties and between counties; (4) develop standards, manuals and procedures for improving assessment practices; and (5) isolate factors influencing land market, and learn why land values go up and down.
Agr. Econ. 61

Okla. Oklahoma Land Market Situation. To provide information on land market situation in Oklahoma to prospective buyers, sellers, and lenders as well as persons interested in public policy as it affects agriculture including sales prices of land, number of sales, minerals transferred, farm real estate sold as percent of total land, sizes of farms sold, extent of mortgages, type of buyer and seller; and quality of land sold, classified according to good, average, and poor.
Agr. Econ. 449-A

Tex.

The Texas Farm and Ranch Land Market Process. To (1) analyze impacts of such basic factors as agricultural productivity and income, general price level, and credit availability and terms on land prices and sales volumes; (2) study inconsistencies in prices and activity due to secondary factors, as mineral values, non-agricultural developments, drought, tax policies, etc.; (3) determine types of buyers and sellers, motivations and intentions, and influence of tenure patterns and land market processes; and (4) relate changes, shown by land prices, in capital needs for agriculture, and chance to start in farming.

Agr. Econ. & Sociol. 950

LAND TENURE

Ala.

Farm Leasing Practices in Selected Areas of Alabama. To determine (1) current farm leasing practices in selected areas; (2) relationships of type-of-farming, financial success, production efficiency, and other selected factors to principal types of tenure in selected areas; and (3) deviation of present farm leasing practices from model leasing practices, and probable effect of these deviations on organization, production efficiency, and success of farm business.

Agr. Econ. 318 (S-11)

Fla.

The Legal Aspects of Farm Tenancy in Florida. To ascertain the farm-tenancy law of Florida and present it in the form of a legal source book in terms understandable to the layman.

Agr. Econ. 656 (S-11)

Ga.

Legal Aspects of Farm Rental and Cropper Agreements in Georgia. To ascertain laws relating to farm rental and cropper agreements. Subjects to include: (1) different types and general description of tenancy and cropper relationships recognized under Georgia laws; (2) legal distinctions between tenants and croppers, and instances wherein this distinction is of importance; (3) rights and duties of landlords, tenants, and croppers implied by law into their rental or cropper agreements and created by operation of law; (4) preparation of publication(s) describing legal rights of farm owners, and other interested persons.

Agr. Econ. 4 (S-11)

Ill.

How Young Families Become Established in Farming, with Special Reference to Those Without Substantial Family Assistance. To determine (1) what assistance is needed to help young families attain goal of family farm operatorship; and (2) character and extent of the problems and to collect data already available.

Agr. Econ. C5-334 (NC-15)

- Ill. Investigations in Agricultural Land Tenure and Transfer. To (1) analyze and report facts as to extent to which farmers in Illinois and in comparable areas have been using various methods of owning, acquiring, selling, and passing to successors farm land, farmer dwellings, other buildings, and improvements; (2) examine and report facts as to ownership of farm land by natural persons (a) who are operating it, (b) who have retired from operating it, (c) who hold land with others in an undivided estate, (d) who have land for possible future operation by family members or for sale to others, and by corporations; and (3) examine and report facts as to place in land tenure system of transferring of title by purchase-sale, by inheritance, and by foreclosure, with special reference to equities and other actual interests transferred.
- Agr. Econ. 05-331

- Ill. Economic Problems of Advancing Age and Retirement as Experienced by Owners of Farm Land in Selected Illinois Areas, 1950, (Contribution to Station Project, Agricultural Economics 300, Investigations in Agricultural Land Tenure and Transfer). To ascertain (1) extent to which farm landowners and their wives have been entering advanced years with estates of farm land of various sizes and degrees of freedom from debt; (2) number and maturity of heirs of landowners and their wives as they approach first stage of retirement from operation or pass on to later stages; (3) as between individual sons and daughters of landowners the differences in services rendered to parents and differences in advantages received from family resources; (4) attitudes developed by landowners and wives toward (a) use of resources for more secure establishment of sons and daughters thru loans, gifts, etc., (b) holding resources intact pending death of parents, (c) including as beneficiaries non-profit agencies, and (d) avoiding sale of entire holding or part of it to persons not of immediate kinship; (5) extent to which landowning parents use (a) councilors for information on tax demands, (b) conference of family members, and councilors for insight into rights of bequest; and (6) to summarize and present questions and alternative answers confronting landowners.
- Agr. Econ. 05-331 A

- Ind. Economic Effects of Field Renting on Resource Use. To learn (1) resources available and the organization of resources on farm in a sample of farms on which tracts are field rented; (2) leasing arrangements, means of allocating resources, and division of product on tracts that are rented under different conditions of topography, size, and productivity of land; and (3) more efficient leasing systems.
- Agr. Econ. 895

Iowa Improving Farm Tenure in Iowa. To (1) ascertain tenure arrangements under which Iowa farms are acquired, operated, owned, valued, leased and transferred; (2) delimit major problems faced by present and prospective farm operators and owners in above phases of farm tenure process; and (3) discover, develop and analyze alternative procedures whereby Iowa farmers may overcome these problems.

Econ. & Sociol. 1043 (NC-15)

Ky. An Economic Study of Lease Arrangements. To determine (1) how different lease arrangements influence resource use and efficiency on farms; and (2) whether or not rental payments are in line with the marginal value productivity of the landlord's resource.

Agr. Econ. 20

Ky. Principles and Techniques Involved in Getting Established in Farming. To (1) determine opportunities for starting in farming, especially young farm families; (2) analyze ways for young farm families to become established as operators of family-sized economic farm units; (3) obtain information from owner-operators on (a) steps in becoming owners, (b) problems met in attaining ownership of adequate-sized farms, and (c) ways and means by which obstacles to attaining ownership were overcome; (4) appraise various methods of getting established in farming and of becoming successful owner-operators of adequate-sized family farms under existing agricultural conditions; and (5) analyze obstacles to getting established in farm and to attaining ownership and operation of farms, and suggest ways of avoiding these obstacles.

Agr. Econ. 29 (NC-15)

Md. An Economic Study of Land Utilization in Maryland.--Farm Tenancy and Leasing Arrangements in Maryland. To determine (1) extent and type of farm tenancy in each agricultural area; (2) what provisions of the leasing arrangements are in each area and equitableness to landlord and tenant of the division of inventory, receipts, and expenses of leasing arrangements; (3) characteristics of tenants and landlords and leasing forms for farms in the different areas; and (4) improvements that can be made in tenancy situation.

Agr. Econ. A-32-f

Mich. A Study of the Occupational Choices of Farm Boys and the Experience of Those Who Started in Farming. Obtain information for young farm boys helpful in making occupational choices, in selecting right educational program, and help becoming successful farmers.

Agr. Econ. 464 (NC-15)

Minn.

A Study of Problems of Land Economics, Including Ownership, Land Prices, Inheritance and Classification. To (1) determine ownership of farm land, characteristics of owners, amount of land owned by types and classes of owners, how land is owned, and how land is acquired and transferred; (2) learn how land is inherited in the State, and how this affects use of farm resources; (3) study land prices by counties, districts, and for State as a whole; (4) evaluate factors affecting land prices; (5) develop measures to reduce distress if and when land values sag; (6) develop procedures to classify rural lands for tax assessment and rural zoning; and (7) appraise progress, problems, and results in rural zoning in the State.

Agr. Econ. 1116

Minn.

How Young Families Get Established in Farming. To (1) determine ways in which farmers have become established in the past; (2) isolate major obstacles now hindering young families in getting established; and (3) explore other arrangements that might aid young families in acquiring farms and accumulating capital and experience needed for success.

Agr. Econ., Rur. Sociol., Home Econ., Educ. 1124 (NC-15)

Mo.

Land Resource Investigations. To learn (1) present use of resources to learn levels and sources of income and kinds of adjustment problems of farmers; (2) alternative methods of increasing productivity and incomes of people in selected areas thru increased efficiency in use of resources; (3) possibilities for providing additional job opportunities for people of selected areas by establishing industries; (4) obstacles to desirable adjustments in use of resources and find ways of overcoming obstacles; (5) methods of adjusting land ownership, land renting and land use patterns to technological changes to eliminate unprofitable operating units; (6) standards useful as guides in renting improvements as dairy barns and poultry houses; (7) extent of shifts from corn, wheat and spring seeded grains to hay and pasture crops; (8) influence changes in land use and expenditures for land development have had on livestock population; (9) how much can be spent per acre profitably for water control structures and soil treatments on various type soils and develop procedures for sharing costs and returns on rented land; and (10) effects of installing water control structures and soil treatment on yields and cost of producing crops.

Agr. Econ. 44

- Mo. How Young Families Get Established in Farming. To (1) learn types of farm business, amounts of investment, and procedures used in establishing successful businesses in selected areas; (2) trace development of successful operating units for purpose of determining types of training and extent of family or other financial help operators have had; and (3) develop procedures for enlarging inadequate farm businesses and for financing young families getting started in farming.
Rur. Sociol. 279 (NC-15)
- Nebr. Land Tenure in Nebraska. To (1) indentify predominating leasing arrangements by economic areas; (2) analyze leasing practices for identifying elements of strength and weaknesses; (3) determine most desirable leasing arrangements; (4) develop basic principle applicable in transfer of land ownership from one generation to the next; and (5) determine ways of encouraging equity and stability in land tenure.
Agr. Econ. 225
- Nebr. Factors Affecting Successful Establishment of Young Farm Families in Farming in Nebraska. To determine (1) relationship between capital accumulation and income of young farm families; (2) kinds and amounts of resources available; (3) sources of borrowed funds; (4) degree of family assistance; and (5) tenure arrangement desired while getting started.
Agr. Econ. 487 (NC-15)
- N. Dak. Effect of Tenure Arrangements on Farm Production Efficiency in North Dakota. To develop (1) practical methods for sharing returns under father-son farming agreements at various levels of input; (2) practical farm-lease provisions to improve efficiency of operations and promote desirable adjustments in land use.
Agr. Econ. 3-11
- Ohio An Analysis of Some Economic and Personal Factors Which Have Influenced the Home and Family Life of a Selected Group of Young Farm Families. To (1) determine relationship between some personal and economic problems faced during first five years of marriage, quality of successful living, and factors which seem to have been helpful to success; and (2) provide knowledge and information for use of persons trying to improve rural homes and family living.
Home Econ. 92 (NC-15)

- Ohio Economic and Social Aspects of Part-Time Farming in Ohio.--To answer 4 questions--(1) what are objectives of part-time farmers? (2) How well do accomplishments of part-time farmers measure up to their objectives? (3) Does use of resources under part-time farming represent a problem to the individual, the community, or in any way raise questions in respect to public policy? (4) How effective is part-time farming as a method of getting established in full-time farming?
Agr. Econ. 112 (NC-15)
- S. C. The Legal Aspects of Farm Tenancy in South Carolina. Ascertain farm tenancy law of South Carolina, relate law and practice, and compile legal source book applicable to farm situations in State.
Agr. Econ. 116 (S-11)
- S. Dak. Farm Tenancy Improvement in South Dakota. To determine under what conditions and at what cost, the tenant farmer's security of tenure may be increased in order that he may more readily adopt the improved farm practices which promote agricultural efficiency and increase net profits consistent with the goals of soil conservations and improved rural living--or more specifically to determine: (1) the comparative effects of cash leasing, crop share leasing, and owner-operatorship on the tenant's security of tenure as indicated by the adoption of improved farm practices; (2) the practicability of tenant ownership of the major farm improvements as in the rapidly increasing ownership of the "farm headquarters" by operators who lease much of the land which they operate; (3) under what circumstances and at what relative costs farm landlords will provide greater security of possession and freedom of operation to tenant farmers; and (4) how the advantages of the crop-share lease and the cash lease may be combined in a manner satisfactory to both landlords and tenants.
Agr. Econ. 147 R
- S. Dak. Attaining, Maintaining, and Transferring Farm Ownership. To explore, develop, and present methods and practices for attaining farm operatorship and ownership which will be helpful to farm families, particularly young families.
Agr. Econ. 166 R (NC-15)
- Tex. Private Forest Land Ownership in Commercial Forest Areas of East Texas. To (1) determine ownership patterns of privately owned forest land in selected areas of east Texas; (2) learn management practices by ownership classes; (3) analyze relationships between ownership classes and management practices, and why those practices are followed; (4) show complementary nature of forest management and use of land for crops and livestock in east Texas; and (5) interpret

results in terms of needs for more widespread application of forestry practices so that public agencies may organize and carry out comprehensive program of forest management education.

Agr. Econ. & Sociol. 953

Tex.

Obstacles to Farming Efficiency under Share Rental Arrangements. To (1) evaluate tenure stability, tenure-associated risk and uncertainty and other known factors which may prevent increased farming efficiency; (2) determine other tenure-associated factors which may be obstacles to farming efficiency in the short and long run; and (3) evolve and suggest incentives and means for overcoming obstacles to farming efficiency.

Agr. Econ. & Sociol. 981

Va.

Landlord-Tenant Relations: A. Farm Leasing Practices; B. Legal Aspects of Farm Rental and Cropper Agreements. A. To (1) determine existing leasing practices, tenant and cropper, on Virginia farms; (2) discover problems and obstacles in present farm leasing arrangements, particularly those which interfere with the adoption of recent innovations in agriculture; and (3) provide information and suggested adjustments in leasing practices that will facilitate removal of such interferences. B. To (1) study laws that impinge on the relations of the landlord, tenant, cropper, and third persons in the operation of the farm; (2) determine how these laws have operated and are currently operating, and their effect upon the conditions and operations of farming (particularly changing practices and arrangements) including the rights and duties of the landlord, tenant, cropper, and directly affected third persons; and (3) evaluate strengths and weaknesses of applicable laws, preferably as actually applied, and to formulate recommendations for improving the objectives and operation of the law thru educational measures or legislative action.

Agr. Econ. & Rur. Sociol. 86023 (S-11)

Wis.

A Study of the Tenure of Wisconsin Farm Land. To analyze the tenure of farm land: (1) focus attention on the influence of periods of prosperity and depressions on the equities farmers have acquired in their land and whether their position is such as to be able to maintain ownership of their land in the event of reduced farm prices in the future; (2) evaluate current government programs designed to encourage farm ownership, particularly with respect to veterans; (3) appraise programs which would minimize the loss of farm ownership if we experience a decline in prices; (4) study landlord-tenant relations on farms subject to erosion where land is owned by estates, widows, retired farmers, non-farmers, corporations, etc.; and (5) test the results of the "succession on farms" research in other areas of the State.

Agr. Econ. 624

REGIONAL PROJECTS

NC-15

How Young Families Get Established in Farming. To determine: (1) How have farmers become established in farming in the past? What methods were used? How were initial capital resources, training, experience, and technical skills obtained?; (2) What are the main obstacles to young folks getting established in farming? What personal qualifications and physical requirements are needed for success in becoming established in farming?; and (3) What are the opportunities for establishing young folks on family type farms as tenants, part owners, or owners? How can initial capital resources be obtained? What farm working agreements, rental arrangements, and other means are best from the long-time standpoint?

Contributing State Projects:

- Ill., 05-334, How Young Families Become Established in Farming, with Special Reference to Those Without Substantial Family Assistance. (page 6)
- Iowa, 1043, Improving Farm Tenure in Iowa. (page 8)
- Ky., 29, Principles and Techniques Involved in Getting Established in Farming. (page 8)
- Mich., How Young Families Get Established in Farming. (Supported with non-Federal Funds)
- Mich., 464, A Study of the Occupational Choices of Farm Boys and the Experience of Those Who Started in Farming. (page 8)
- Minn., 1124, How Young Families Get Established in Farming (page 9)
- Mo., 279, How Young Families Get Established in Farming (page 10)
- Nebr., 487, Factors Affecting Successful Establishment of Young Farm Families in Farming in Nebraska. (page 10)
- Ohio, 92, An Analysis of Some Economic and Personal Factors Which Have Influenced the Home and Family Life of a Selected Group of Young Farm Families. (page 10)
- Ohio, 112, Economic and Social Aspects of Part-Time Farming in Ohio. (page 11)
- S. Dak., 166 R, Attaining, Maintaining, and Transferring Farm Ownership. (page 11)

Southeast Farm Land Tenure Studies. To (1) determine and appraise rental arrangements in specific types of farming areas and develop possible alternative agreements which farmers may use in making adjustments in farm organization and production practices, such as the adoption of mechanical power and equipment and the introduction and expansion of livestock enterprises; (2) develop procedures for facilitating adjustments in the size and characteristics of farming units through the study of institutional patterns and methods of farm ownership and operation, including capital availability and requirements, the size of farm land holdings, and the interrelationship between part-time farming, industrial development, retirement programs, and occupational stability; and (3) develop ways of facilitating adjustment in land tenure practices and policies through study of the implication of legal aspects of tenure, influence of market conditions, and effects of farm tax assessment methods.

Contributing State Projects:

Ala., 318, Farm Leasing Practices in Selected Areas of Alabama.
(page 6)

Fla., 656, The Legal Aspects of Farm Tenancy in Florida. (page 6)

Ga., 4, Legal Aspects of Farm Rental and Cropper Agreements in Georgia. (page 6)

S. C., 111, Farm Tax Assessments in the Southeast. (See Section d)

S. C., 116, The Legal Aspects of Farm Tenancy in South Carolina
(page 11)

Va., 86023, Landlord-Tenant Relations: A. Farm Leasing Practices;
B. Legal Aspects of Farm Rental and Cropper Agreements
(page 12)

Economic Analysis of Ground-Water Laws in the Western States.

To (1) analyze the economic implications of present laws which affect ground-water use; (2) evaluate experience with laws which directly aim at regulating ground-water use; and (3) study specifically the economic implications of rationing ground-water between uses and users.

Contributing State Projects:

Colo., 236, Economic Effect of Ground-Water Laws and Related Institutions on Ground-Water Use in the Lower Bijou Basin, Morgan County, Colorado. (page 1)

N. Mex., 59, An Analysis of Ground-Water Laws, and Related Institutions as They Affect the Economy of Lea County, New Mexico.
(page 1)

Utah, 485, Economic Effects of Ground-Water Laws and Related Institutions in Cache County, Utah. (page 1)

LIST OF SUMMARIES OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

SESD-OD-1103:			:
Summary	:	Subject-Matter Area	:
Number	:		:
			Title of Summary
1		Agricultural Chemistry	Agricultural Chemistry
2		Agricultural Economics	a. Prices, Incomes, & General Studies of Com- modities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3		Agricultural Engineering	a. Land & Water Use & Develop- ment b. Power Machinery & Equipment c. Farm Structures & Materials
4		Animal Industry	a. Beef Cattle b. Sheep & Goats c. Swine
5.		Dairy Husbandry	Dairy Cattle
6		Dairy Technology	Dairy Technology
7		Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8		Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9		Food Science & Technology	Food Science & Technology (Secs. a, b and c)
10		Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11		Forestry	Forestry
12		Fruits & Nuts	Fruits & Nuts

SESD-OD-1103 : Summary : Number :	Subject-Matter Area :	Title of Summary :
13	Home Economics	<ul style="list-style-type: none"> a. Human Nutrition b. Housing c. Clothing and Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	<ul style="list-style-type: none"> a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	<ul style="list-style-type: none"> a. Plant Pathology & Botany b. Diseases of Field Crops c. Diseases of Fruit Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils & Fertilizers	Soils & Fertilizers
22	Vegetables	<ul style="list-style-type: none"> a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control

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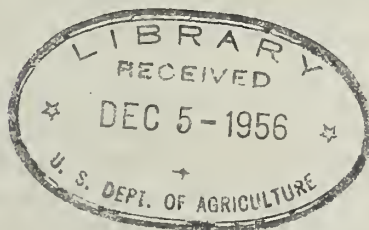
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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS //

JULY 1955

Section b
POWER MACHINERY AND EQUIPMENT
AGRICULTURAL ENGINEERING



20
Compiled in the
State Experiment Stations Division //
Agricultural Research Service,
United States Department of Agriculture
50 Washington, D. C. //

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

- Ala. Mechanization of the Harvesting of Cotton. To evaluate and improve
(1) machines and methods for preparing cotton crop of mechanized harvest;
(2) machines and methods for mechanical harvesting; and (3) mechanical
harvester performance in relation to plant characteristics.
Agr. Eng. 506. Coop. ARS. Reg. S-2
- Ala. Control of Cotton Insects. To determine effectiveness of new
insecticides against the boll weevil and other cotton insects and the
effect of controlling various species upon the yield of cotton and to
develop a dusting schedule for the control of the major insects attack-
ing cotton.
Zool., Ent. 512
- Ala. Improvement of Production and Utilization of Feed and Forage for
Beef and Dairy Cattle in Alabama. To learn, at various locations in
the state, the factors affecting the efficiency of utilization of mix-
tures of legumes and grasses by beef and dairy cattle; (a) to learn re-
lationship between the production of dry matter of various legumes and
grasses under various management practices and the production of animal
products; (b) to investigate the efficiency and economy of utilizing
certain high yielding crops as soilage, silage, or hay to supplement
pasture or grazing crops; (c) learn costs and returns of irrigation on
permanent pastures and on forage crops harvested for silage or hay; (d)
learn the feasibility of reducing labor requirements by mechanization of
harvesting, storing, and feeding silage and hay; and (5) to investigate
supplementary feeding and the factors of age and finish in relation to
the economics of forage crop utilization.
Agron., Agr. Eng., A.H., Nutr., D.H., Ag. Ec. 555
- Ala. The Market Value of Peanuts as Affected by Changes in Chemical and
Physical Properties During Storage. To learn (1) effects of storage on
chemical, biochemical, and physical changes in peanuts; (2) relationship
of initial quality of peanuts to changes during storage; (3) relation of
microflora to respiration and associated deteriorative changes in peanuts;
(4) relationship between chemical, biochemical and physical properties and
changes in odor, flavor, and certain nutritive factors affecting market
value of peanuts.
Bot., Pl. Path. 570
- Ala. Grain and Forage Harvesting, Processing and Storage. To develop
improved methods and to adapt equipment for (1) harvesting, conveying,
drying, storing, mixing, grinding, and feeding grains; (2) harvesting,
conveying, drying, storing, mixing, grinding, and feeding hay crops
that will reduce labor requirements and processing costs and improve
hay quality; (3) feeding silage crops that will reduce labor and pro-
cessing costs and improve silage.
Agr. Eng., Hort. 572
- Alaska Production, Processing and Preservation of Alaskan Roughage. To
(1) determine feeding value of barn dried hay and silage fed independ-
tly and in combination, (2) compare peas and oats silage and barn dried
hay with bromegrass silage and barn dried hay, (3) compare feeding value
of peas and oats and bromegrass silage made in conventional way with the
same crops preserved as baled silage, and (4) develop inexpensive methods
of drying hay by forced air, by stacking partially cured hay on a false
tunnel.
Agron., Dairy, Agr. Eng. AL-1-3-11 (P)

- Alaska Improvements to and the Preparation of Specifications and Plans for a Single-Row Potato Top Beater. To (1) improve the operating efficiency of the single-row top beater developed under project AL-1-4-1 (F); and (2) publish specifications and plans which will enable the individual grower to build his own low-cost machine.
Agr. Eng. AL-1-4-6 (F)
- Alaska Handling and Storing High Moisture Content Cereal Grain. To (1) make engineering tests of batch type drier developed by Alaska Experiment Station; (2) test effectiveness of drying rates of 6 and 12 CRM per bushel in preventing spoilage and removing moisture from grain in bins; and (3) continue observations to determine safe moisture content for bin storage of barley without air circulation.
Agr. Eng. AL-1-4-7 (R)
- Ariz. Mechanization of Cotton Production and Harvesting. To (1) increase efficiency in mechanized production of irrigated cotton by study and development of machinery and methods for improvement of seedbed preparation, planting and cultivation; (2) determine effect of various cultural treatments and harvesting procedures upon efficiency of machine harvesting machines; and (3) determine desirable plant and cotton characteristic for mechanical harvesting.
Agr. Eng., Agron. 269. Reg. W-24. Coop. BPI
- Ariz. Breeding Cotton for Disease and Insect Resistance and for Plant Types Suitable for Mechanical Harvesting. To (1) evaluate resistance of present breeding stocks to local diseases and insects and ability for mechanical harvesting, (2) introduce stocks from other localities having similar problems, (3) cooperate in production of high yielding varieties of good spinning quality suitable for mechanical harvesting, and (4) provide adequate initial seed stocks of desirable strains for distribution to growers.
Pl. Br. 278. Reg. S-1. Coop. BPI
- Ariz. Efficiency in the Harvesting and Use of Seeded Forage Crops. Compare costs and returns from alternative methods of forage crop harvesting (silage, green chopping, chopped hay, and baled hay) for representative sizes of farms. Compare capital, labor, and machines required for alternative harvesting methods. Analyze interrelationships between forage crop and harvesting method used. Analyze effect on farm organization and management practices, effect on net farm earnings of alternative forage harvesting. Establish guides for farmers showing most efficient method or combination of methods of harvesting and utilization.
Ag. Ec., Ag. Eng., A.I., Forg. 387. Coop. ARS, Reg. W-36
- Ariz. The Planning and Coordination of Research Under Regional Project W-24, Improvement of Mechanized Production and Harvesting of Irrigated Cotton in the Arid and Semiarid West. To further regional research on the mechanized production and harvesting of irrigated cotton by serving as trustee for Section 9b3 funds allotted to the planning and coordination of W-24.
Reg. W-24.

Ark. Conditioning and Storage of Small Grains, Seeds and Legumes.

To study effect of temperature and moisture on keeping qualities of grain as indicated by odors, germination, and viability, of small grains, legumes, and seeds, and milling quality of rice; (2) determine quality of grain stored under various conditions for different periods of time; (3) study effect of external sterilizing grains on keeping qualities, germination, and milling; and (4) study effect of aeration on drying and keeping qualities of small grains, seeds, and legumes.

Agr. Eng. 325

Ark. Engineering Aspects of the Mechanization of Cotton Production and Harvesting in Arkansas.

To design and improve machines and develop methods which will reduce manpower needs to a minimum and increase output per laborer to a maximum with respect to the following phases connected with growing of cotton: (1) seedbed preparation, (2) weed control, (3) evaluating and improving machines for preparing the cotton crop for harvest, and (4) evaluating mechanical harvester performance in relation to plant characteristics.

Agr. Eng. 395. Reg. S-2.

Calif. Economic and Engineering Studies of Packing House Practices.

Economic studies will include labor input incentive systems, time and motion studies, and such other investigations as may be needed to improve work efficiency, working conditions, and physical efforts of employees. Engineering studies will include analysis of the flow of materials through the packing house and storage rooms, fruit handling equipment, disposal of products, by-products and wastes, efficiency of mechanical equipment, and analysis of operations which may lead to equipment improvement, labor reduction, and lower operating costs.

Ag. Ec., Agr. Eng. 1331.

Calif. Forage Seed Harvesting and Processing. To (1) evaluate present procedures and equipment used in curing, harvesting, threshing, and cleaning seed of various forage crops; (2) develop improved techniques thru modification of existing equipment to recover a greater percentage of seed crop in damage-free condition; (3) develop new special equipment if existing equipment cannot be modified to handle seed of forage crops satisfactorily; (4) give consideration to development of equipment and methods for harvesting certain crops which would be valuable for forage if seed could be recovered economically; (5) give consideration to improvement of cleaning and processing equipment and techniques followed in handling threshed seed of various forages; and (6) determine fundamental principles underlying harvesting procedures so that harvesting methods can readily be adapted to any new crops or unusual conditions without trial and error experimenting in each situation.

Agr. Eng., Agron. 1549

Calif. Development of Mechanical Harvesting and Field Handling of Deciduous Tree Fruits, Nuts, Grapes, Olives, Berries and Vegetables. To (1) reduce labor requirements and unit costs of harvesting tree and vine crops thru design and development of mechanical equipment and improved handling techniques; and (2) maintain quality of final product under a revised harvesting system.

Agr. Eng., Pom. Viti. 1551.

Calif. Engineering, Qualitative and Economic Studies of the Packaging, Handling, and Shipping of Deciduous Fruit. To (1) develop new containers, suitable equipment and improved techniques for packaging and handling deciduous fruit, and determine how these developments influence plant operations, packing and shipping costs and quality of product at consumer level; (2) determine basic laws underlying volume fill in containers for various shapes and sizes; (3) work with container manufacturers in developing suitable containers and standardizing packages as soon as basic principles are established; (4) develop improved equipment for more accurate sizing of fruit if needed; (5) if sorting on basis of color becomes necessary, apply known principle of electronic color sorting; (6) study car loading patterns to determine best arrangements for full or partial shipments on containers of various types; (7) determine best methods of pre-cooling fruit packed, or to be packed, in various type containers; (8) keep continuous record of condition and quality of fruit from time it leaves tree until reaching final consumer; (9) study influence of maturity on handling and packaging; (10) make economic studies of pilot packing lines to compare with studies of conventional methods; and 2 other objectives.

Agr. Eng., Pom. Ec. 1579

Calif. Time and Motion Studies of Vegetable Harvesting in Relation to New Techniques in Large Scale Production. To (1) develop new and better methods of performing vegetable work by eliminating unessential operations; (2) develop equipment to reduce work in vegetable operations; and (3) obtain ideas as to how methods may be improved by dealing with time intervals required for different operations.

Agr. Eng., Veg. Cr. 1592.

Calif. Cultural Practices for Potatoes as Influencing Yield and Quality. (1) Develop methods of growing, handling and planting seed potatoes to improve stands, yield and quality. (2) Adapt newer fertilizers to bed-planted furrow-irrigated plants. (3) Determine causes and means of preventing physiological disorders. (4) Integrate studies with breeding and post-harvest handling research.

Agron., Pl. Path., Eng. 1665.

Calif. Economic Analysis of Forage Harvesting and Utilization With Emphasis on Green Chopping Techniques. From 1-4 Analyze the physical and economic aspects as: (1) relationships among alternative or combinations of methods and machines, (2) effects of alternative harvesting methods or combinations of methods on handling and utilizing forage and on livestock management systems, (3) interrelationships among alternative systems of harvesting and utilizing crops and size and type of operation, (4) input-output relationships for systems of harvesting and utilizing crop and effects on farm earnings, (5) analyze effects of harvesting systems and use of crops on tenure, capital, managerial functions.

Ag. Ec., Agron. 1672. Reg. W-36.

Calif. Basic Requirements and Design Principles of Mechanical Equipment for the Production and Handling of Vegetable Crops. Reduce cost of producing vegetable crops in southern California without decrease in quality and grade.

Agr. Eng., Veg. Cr. 1674.

- Calif. Development, Improvement, and Testing of Mechanical Equipment for the Production of Cotton. To reduce labor and costs and improve yield and quality. Stock shredders, planters, fertilizers, cultivators, sprayers, dusters, topping machines, and harvesters as well as cultural practices to improve performance of equipment are to be tested.
Ag. Ec., Agron, 1677. Coop. USDA. Reg. W-24.
- Conn.
(Storrs) Determination of the Basic Job Requirements of Machinery for Harvesting and Storage of Grass Silage. To (1) develop methods and techniques for determining power needed in separate operations of silage harvesting and loading machines; (2) separate job into individual components and learn power needs to overcome these forces; (3) compare basic power requirements with those of present day equipment, thereby learning relative efficiency and adequacy of design; and (4) investigate machines used in industry for similar operation.
Agr. Eng., Ag. Ec., Agron. 218. Reg. NE-13.
- Fla. Improving Methods and Practices in Harvesting, Handling and Packing Early Irish Potatoes. To determine (1) effects of different methods of mechanical harvesting and handling of early Irish potatoes on existing packing house organizations, harvesting practices, quality and costs, and (2) type of packing house organization and operation and harvesting methods and practices that will result in highest quality at lowest cost.
Ag. Ec. 638. Coop. BAE, BPI, Reg. SM-5.
- Fla. Pasture Renovation. To develop one or more methods for restoring or increasing the vigor and production of permanent pasture plants through the use of renovation equipment.
Ag. Eng., Agron. 661
- Ga. Mechanization of Cotton Production. To improve (1) methods of disposal of cover crops and crop residues, (2) machinery for planting cotton in trashy soil, and (3) methods of controlling weeds in cotton, including cost reduction.
Agr. Eng. 3. Coop. USDA. Reg. S-2
- Ga. Peanut Curing. To determine effect of (1) various curing methods upon quality and yield of peanuts for seed stock, edible trade, and oil and (2) high temperatures on edible qualities and viability of peanuts; (3) to devise methods of curing to reduce labor costs and improve the quality of peanuts.
Ag. Eng., Bot., Chem. 15. Coop. BPI.
- Ga. The Use of Chemicals for Weed Control and Defoliation of Crop Plants. To determine (1) most economical method to control weeds in cultivated crops; (2) most satisfactory and economical method to control weeds in small grain and sod crops, and (3) effectiveness of materials used for defoliation of cotton and other crops and what effect chemicals have on quality and quantity of crops harvested.
Agron. 34. Coop. BPI.
- Ga. Mechanized Farming. To develop a crop rotation system that will utilize more efficiently farm machinery and labor throughout the year, to determine the adaptability of machinery now available and new machinery as introduced, and to study the cost and labor requirement for the production of field and vegetable crops with machinery.
Agr. Eng., Agron. 41.

Ga. The Effect of Fertilizer Ratios and Methods of Placement on Peanut Yields. To (1) determine most profitable ratios and rates of fertilizers for use on peanuts, (2) determine optimum placement of peanut fertilizers, and (3) develop satisfactory equipment for optimum fertilizer placement when determined.

Agr. Eng. 49. Coop. AERB.

Hawaii Efficiency in the Harvesting, Processing, and Handling of Forage Crops in Hawaii. (1) Analyze and compare physical and economic input-output relation of different methods and machines, (2) learn effect of methods of harvesting and handling on quantity and quality of forage produced by each method, (3) analyze interrelationships among type and size of operation and alternative methods of harvesting, handling and using said crops and note effect of interrelationships on net farm income under varying price-cost conditions, (4) evaluate effectiveness of present methods and learn need for new machines and new methods.

Ag. Ec., Agron. 362. Coop. ARS. Reg. W-36

Idaho Reducing Mechanical Damage and Subsequent Deterioration of Potatoes. To determine (1) manner and extent to which each step in harvesting, storing, grading, washing, handling, packaging, loading, and retailing potatoes contributes to mechanical damage; (2) manner and extent to which each step in bulk handling, into and out of storage, contributes to mechanical damage of potatoes; (3) effect of different storage conditions on further deterioration of mechanically injured potatoes; and (4) effectiveness of various types of automatic temperature control units for potato storages.

Hort. 1.

Idaho The Design and Evaluation of Farm Mechanization Systems Under Idaho Conditions. To (1) survey or inventory present status of farm mechanization in Idaho, and (2) learn problem areas in general field of farm mechanization.

Agr. Eng. 28.

Idaho A Survey of the Current Types of Livestock Feeding Equipment Towards the Development of Labor-Saving Methods of Handling and Controlled Feeding. To determine (1) extent to which livestock feeding is done by mechanical methods; (2) type of feed control devices and handling equipment produced commercially adaptable to mechanical feeding; (3) extent to which available equipment could be used by testing equipment in a pilot plant set-up; and (4) thru pilot plant set-up, best methods of adapting equipment to remove "tramp metal" from livestock feeds.

Agr. Eng., D.H., A.H. 175.

Idaho Efficiency in the Harvesting and Use of Forage Crops in Idaho. (1) Compare physical and economic cost and return relationships among different methods or combinations of methods and machines used in harvesting forage. (2) Learn efficiency of present methods and learn areas in which improvements are needed. (3) Learn economic effect of alternative methods of harvesting and use on farm operation and on net income.

Agr. Eng., Ag. Ec., Agron. 294. Coop. ARS. Reg. W-36

- III. The Economics of Farm Power, Machinery, and Equipment Use. To (1) determine costs and benefits of using selected types of farm equipment; and (2) develop efficient power, machinery and equipment organizations for various types and sizes of Illinois farms.
Ag. Ec. 05-303.
- III. Improvement of Power, Machinery, and Labor Efficiency. b. Improvement of Efficiency and Safety of Corn Harvesting Machinery. To (1) find improved methods of harvesting corn and (2) establish design principles for harvesting equipment which will reduce corn losses and accident hazard.
Ag. Eng. 10-332.
- III. Improvement of Power Efficiency By Increasing Tractor Valve Life. To (1) investigate factors of farm tractor design, fuel use, operation, and repair which will reduce tractor valve sticking and burning (general objective); (2) find increase in tractor valve life possible by installation of rotating and free-valves; (3) find relation of gum content of gasoline and valve sticking in farm tractors; and (4) determine conditions of farm fuel storage which cause excessive gum formation.
Agr. Eng. 10-334.
- III. Procedures and Equipment for Filling and Unloading Vertical Silos. To improve the efficiency and effectiveness of procedures and equipment for handling silage into and out of silos and eliminate manual handling.
Agr. Eng. 10-352.
- III. Crop Processing. To (1) improve farm crops by better methods of curing and handling, including testing and improvement of equipment to accomplish this purpose, and (2) investigate cleaning of field seeds to remove foreign matter and obnoxious weed seeds to aid in weed control of farm crops.
Agr. Eng. 10-391.
- III. The Effect of Tillage, Planting Method, and Placement of Fertilizer on the Production and Maintenance of Forage Crops. To (1) determine effect of deep tillage and placement of fertilizer on grain and forage yields and maintenance of stand composition; (2) determine effect of various methods of seedbed preparation on grain and forage yields and stand composition; (3) study root development under above treatments; and (4) study effect of deep tillage and methods of seedbed preparation on water storage capacity of soil, availability of soil moisture and on soil, and water losses.
Dixon Spgs. 40-326.
- III. Steam Injection for Practical Prevention of Film Formation in Evaporating Hot Broken Tomato Juice. Find best design and method of operation of steam injection for use in commercial plants to prevent film deposition in concentration of hot broken juice.
Fd. Tech., Agr. Eng. 50-386.
- III. Drying and Curing Problems of Seed Sweet Corn and Popcorn. To determine factors causing injury to sweet corn seed during artificial drying and to work out methods of artificially curing popcorn for market.
Hort. 65-340.

- Ind. Determination of Drying Rates of Grains in Bulk Air Drying Systems.
To (1) determine heat requirements for vaporization of grain moisture;
(2) determine maximum drying rates as limited by characteristics of
grain (exposed drying rates); and (3) develop methods to predict rates
of drying of successive layers in a bulk of grain as influenced by
system variables.
Agr. Eng. 273.
- Ind. The Development of Equipment and Methods for the More Efficient
Conveying of Forages on the Farmstead. To develop new or improved
equipment and methods for conveying forages on the farmstead.
Agr. Eng. 634. Reg. NC-23.
- Ind. A Determination of Design Requirements for Agricultural Machinery.
To (1) measure magnitude, frequency and characteristics of loads and
inertia and torsional forces in moving parts of principal farm machines
operating under actual field conditions; and (2) determine power and
energy requirements for each of several processes performed by a given
machine and interplay of power between 2 or more processing units of
the machine.
Agr. Eng. 638.
- Ind. The Relation of Drying and Storage Practices to the Deterioration
of Grain. To determine (1) relation of ventilation rate and weather to
deterioration of grain during drying; (2) effect of moisture content and
conditioning methods used on deterioration of ear corn in storage; and
(3) effectiveness of and needs for low volume ventilation to prevent
damage to stored grain and related products.
Agr. Eng., Agron., Biochem. 742. Coop. BPI.
- Iowa Utilization of Electric Service in Rural Areas of Iowa. To study
(1) chore labor mechanization in which survey will be made of methods
of performing chore operations of the larger and more efficient beef,
swine, and poultry enterprises, (2) heating with electricity for homes,
farrowing houses, milk houses and milking parlors by use of radiant
heating panels, space heaters and heat pumps, and (3) new types of
household appliances.
Agr. Eng. 1282. Coop. AERB.
- Iowa Handling Grain Through Harvest, Drying and Storage. To evaluate
comparatively on basis of capital requirements, operating costs and
labor methods of handling grain from harvest through drying and storage.
To develop and test a palletized system of handling grain from harvest
through drying and to storage in relation to those methods now available.
To develop, test and evaluate other new methods of handling grain which
may become apparent during these studies. To examine design of grain
drying installations in relation to harvesting machine capacities and
performances.
Ag. Eng., Ag. Ec. 1295. Coop. AERB
- Kans. Economics of Grain Storage. To improve the efficiency of present
and potential grain storage facilities, specifically, to evaluate con-
ditions influencing size, type and location; determine economics of
shrinkage and quality deterioration; and analyze storage costs and
factors influencing them under various alternative conditions.
Ag. Ec. 384. Coop. AMS, FCA. Reg. NCM-10.

- Ky. Efficiency of Labor and Equipment in Handling Tobacco on Loose-Leaf Warehouse Floors. To discover ways of saving labor in the physical handling of tobacco received, sold, and loaded out by loose-leaf tobacco warehouses. More specifically, (1) to develop ways of organizing the crew for more efficient operation, (2) to devise mechanical equipment which may simplify or speed up the work, and (3) to discover the amount and arrangement of unloading space, of scales, of sales space, etc. which seems most effective in handling tobacco for sale for auction.
Mrkts. & Rur. Fin. 9
- Ky. Economics of Farm Equipment Ownership and Use. To (1) determine cost use relationships for power farm equipment as influenced by size of farm or amount of work done annually with view to indicating place and limitation of power machinery under Kentucky farming conditions, (2) study ownership arrangements and joint use of power machinery to indicate most practical and useful arrangements whereby family size farm can most economically utilize power machinery, and (3) indicate investment and unit costs involved in handling forage crops in Kentucky by various power machinery methods in actual use.
Ag. Ec. 26
- Ky. Study of Fuels and Equipment for Curing Burley Tobacco. To determine what fuels and equipment may be used economically to obtain a high quality cure in burley tobacco.
Agron. 58.
- La. Cotton Breeding and Genetics. To develop varieties of cotton for Louisiana which are better adapted to the climatic and soil conditions than present-day varieties.
Agron. 204. Coop. USDA
- La. A Study of the Deficiencies of Agricultural Implements Applied to Sugar Cane Culture. To (1) determine economical and practical method of preparing land including flush plowing, cut crowning and ditch bank pull-in, etc.; (2) determine economical method of cultivation, and grass and weed control in sugar cane; (3) improve existing cultivation machines, or develop new ones embodying above principles; (4) develop new equipment and test present equipment for handling fertilizers, especially those handled under pressure; (5) test to adapt present available commercial stalk shredders or choppers, or develop new machines to shred cane trash after harvest; and (6) study row spacing of 44, 57, and 72 inches under flat and ridge cultivation.
Agr. Eng. 211. Coop. USDA.
- La. Rice, Small Grain and Grass Seed Harvesting, Handling and Drying. To (1) determine most economical and efficient methods of harvesting, (2) determine cause and remedy for checking and breaking of grains, and (3) develop low cost farm storage and driers.
Agr. Eng. 501.

La. Improved Methods of Harvesting, Handling, Curing and Storage of Hay and Silage. To (1) continue studies with duct systems and fan layout for barn hay drying adaptable to the present Louisiana barn; (2) continue developmental work on an economical burner and on safety controls for burning natural gas and butane; (3) make comparative studies handling costs for long hay vs. chopped hay and merits of equipment for handling each when using a barn dryer for finish curing; (4) continue development work and cost studies on use of forage wagons for drying chopped hay; (5) determine pressures on side walls of above-ground trench silos and most suitable type of material to use for sides under Louisiana conditions; (6) determine cost of constructing above-the-ground trench or horizontal silo using various types of materials for side walls; (7) determine spoilage on top of above-the-ground or horizontal silos with various methods of packing, and make comparison using various materials for cover; (8) determine most economical type of floor to be used in horizontal, self-feeding silo; and (9) determine the merit, if any, of chopped silage vs. long silage from a handling, labor, and equipment standpoint.

Agr. Eng. 571.

La. Development of Machinery and Methods for the Planting, Cultivating and Harvesting of Sweet Potatoes. To (1) develop a machine to cut and bundle vine cuttings from a field plant bed, (2) learn most practical methods and means for applying weed controlling chemicals when planting sweet potatoes, (3) develop satisfactory tools when using chemicals for weed control, (4) develop means and methods for gathering sweet potato vines for silage, (5) develop machinery for cleaning vines from the row before digging, without damage to potatoes, and (6) continue developmental work on harvesting and handling machinery to meet changes in needs of handling, grading and processing.

Agr. Eng., Hort. 846

La. Grass and Weed Control. To evaluate and improve machines and methods (1) for disposal of crop residues in mechanical cotton production, (2) for planting cotton in mechanical cotton production, (3) for control of weeds in mechanical cotton production, and (4) for preparing cotton crop for mechanized harvest.

Agr. Eng., Agron. 858. Reg. S-2.

Maine Harvesting and Storage Experiment With Maine Apples. To determine (1) adaptability of Maine apples to controlled atmosphere storage; (2) proper time of harvest for best storage; (3) effects of various fertilizer and mulching treatments on storage life, quality, and color of fruit; (4) effect of use of carbon filter systems on storage life; and (5) keeping quality of red sports of varieties as compared to standard variety.

Hort. 17.

Maine Pruning Experiments on the Low-Bush Blueberry. Main objective is to develop a pruning method which might replace burning which is now used. It is also desirable to use some conventional methods of pruning in connection with burning to find more efficient and effective procedure and equipment for fields that have factors which make burning necessary. Also to determine under various conditions if a 2-year or 3-year cycle of pruning is most profitable.

Hort., Agr. Eng. 27

- Maine Effect of Field Traffic and Maine Winters on the Physical Condition of Potato Soils. To (1) measure amount and depth of compaction that occurs in potato fields as a result of mechanical traffic; (2) study effect of Maine winters on resulting compaction; and (3) study effect of above factors on soil aggregation.
Agron. 36. Reg. NE-11.
- Maine Improved Mechanization for Storing Forage Crops. To develop improved methods and equipment for: (1) field loading, unloading and conveying baled hay into storage; (2) unloading chopped hay and distributing it in storage; and (3) unloading grass silage and placing it in different types of silos.
Agr. Eng. 39. Reg. NE-13.
- Maine Economics of Forage Production, Harvesting, Storage and Utilization on Central Maine Dairy Farms. To (1) ascertain and describe major patterns of production, harvesting, storage and use of forages on Central Maine dairy farms; (2) determine costs of producing, harvesting, storing and using forages on farms with these patterns; (3) determine milk production and associated income potential from feeding forage available under major patterns; and (4) compute and compare net incomes above feed costs resulting from feeding forage available under the patterns.
Ag. Ec. 45. Coop. ARS. Reg. NE-18.
- Maine Study and Development of Improved Methods and Equipment for Harvesting and Moving Potatoes to Storage. To improve potato quality and handling efficiency through design and development of methods and equipment for harvesting and moving potatoes to storage.
Agr. Eng., Agron. 54
- Maine Roughage Preservation Under Maine Conditions. To (1) study relative preservation of dry matter, protein and carotene in grass silage, barn-cured hay on an acre basis, and (2) determine relative milk production obtained from an acre of grassland when forage is preserved as grass silage, barn-cured hay and field-cured hay.
Agron., Ag. Chem., An. Ind. 60
- Maine Study and Development of More Efficient Methods and Equipment for Handling Potatoes Through Storage and Packing Houses. To improve potato quality and handling efficiency thru design and development of methods and equipment for handling, storing, and processing potatoes thru storage and packing houses.
Agr. Eng. 62.

Maine

Developing More Efficient Work Methods, Devices and Equipment for Physical Handling, Cleaning, Washing, Waxing, Grading, Sizing, Packaging and Other Related Practices on Maine Potatoes in Commercial Packing and Storage Houses. To increase productivity of labor employed in Maine potato storage and packing houses and reduce losses from decay, bruises, and other injuries by: (1) measuring relative efficiency of various types and combinations of types of equipment, including innovations, for performing materials handling, cleaning, washing, waxing, sorting, sizing, packing and other related practices in commercial potato packing and storage houses under variable conditions; (2) developing and testing improved methods for using various types and combinations of types of equipment for these operations; (3) developing plans for and testing prototypes of new types of equipment; (4) determining amounts of equipment of various sizes needed by packing and storage houses of various sizes to efficiently perform workload; (5) determining amounts of space that can be used in bins and store room when different types of equipment are used; (6) determining types of equipment and design of storage houses to most economically provide proper storage conditions; and (7) translating data from studies of materials handling practices into improved commercial facility designs.

Ag. Ec., Agr. Eng. ES 299.

Md.

Studies on the Efficiency of Fixed Boom Low Volume Sprayers. To (1) determine minimum amount of spray needed to secure adequate coverage and satisfactory control of insects on vegetable and canning crops; (2) develop efficient types of spray booms suitable for different row and broadcast crops; and (3) develop versatile equipment that may be used on several crops, particularly the adaptation of corn spraying equipment to spraying of peas and beans.

Agr. Eng., Pl. P., Bot. H-46-d.

Md.

Pneumatic Handling of Chopped Forage. To (1) determine such factors as air velocity needed to completely float chopped hay both horizontally and vertically, ratio of air to material, effect of velocity on ratio of air to material, etc. in blowing chopped forage with special reference to partially cured chopped hay; (2) determine equipment needed to introduce chopped forage into air stream and place chopped hay uniformly on barn drying systems with emphasis on reduced labor and uniform drying; and (3) check and modify equipment developed above to use in other phases of forage handling.

Agr. Eng., A.H. R-16. Reg. NE-13

Mass.

The Study of Various Practices Used in Harvesting, Handling, and Marketing Certain Native Vegetables as They Relate to Post Harvest Length of Life, Quality and Consumer Acceptance. To develop more efficient methods of maintaining peak harvest quality and to reduce spoilage during handling and marketing of locally grown vegetables.
Oleri. 912

Mass.

Mechanical Handling Methods for the Production of Superior Forage. To determine (1) machinery requirements for handling superior forage, and (2) manner in which findings in (1) can be adapted to available farm machinery and buildings.

Agr. Eng. 1006. Reg. NE-13.

- Mass. Investigations on Mechanizing Cranberry Production. To investigate possibilities of consolidating many operations used in growing cranberries by development of a universal machine.
Agr. Eng. 1011
- Mich. Creamery and Milk Plant Sanitation. To make bacteriological studies of dairy plant procedures and processes to determine their influence on quality, bacteria count, and safety of milk and dairy products.
Bact. 3
- Mich. Frost Control on Vegetation by Convected Heat, Infrared Radiation, and Air Movement. To (1) investigate all possibilities of generating infra-red which would be adaptable to frost control, and develop methods and equipment entailing lowest manufacturing costs, using liquid fuels, and using LP gas; and (2) investigate possibility of using helicopter rotor as a method of bringing warm upper air down on the crop, with added heat.
Agr. Eng. 6-A
- Mich. The Use of Several Tillage Methods for the Preparation of Seed Beds for General Agricultural Crops. The effect of various methods of seed bed preparation on the resulting agricultural crops as to yield and quality will be studied. Observations will be made of the effect on the physical properties of the soil.
Soil Sci. 7
- Mich. Producing, Curing and Storing Legume, Grass and Cereal Hay or Silage of High Protein and High Energy Value. To determine the practicability of producing, curing and storing forages of high feeding value and to preserve their feeding value.
Field Cr. 48
- Minn. Utilization of Electricity in Agriculture.--4. Heat Pump Applications in Crop Processing. To study (1) heat pump application to crop conditioning thru lab studies; (2) drying characteristics of various crops under different drying conditions and (3) economics of use of heat pump for crop conditioning.
Agr. Eng. 1202-4.
- Minn. Labor Saving Methods in Handling and Feeding Silage and Soiling Crops to Dairy Cattle in Outside Feed Lots. To (1) develop a system of feeding silage on outside feed lot for dairy cattle under loose housing system of management with these features: a silo unloading equipment, b conveying and distributing mechanism to uniformly distribute silage in feed bunks, and c provision for loading wagons or portable feed bunks where silage must be transported from silo to distant feed bunks; (2) incorporate in design of above equipment or develop additional equipment as needed for handling soiling crops brought to feed lot from the field and fed in same manner as silage, and (3) install and put into operation, part or all of above system at the Station at Rosemount dairy unit and obtain performance data on its operation.
Agr. Eng. 1210. Reg. NC-23

- Minn. Design and Development of Equipment and Methods for Weed Control. To (1) determine by lab or field tests factors which affect operating characteristics of machines or machine elements used in all methods of weed control; (2) design and develop new machines or machine elements or make design improvements in available equipment; (3) formulate recommendations on proper use of weed control equipment; and (4) conduct lab or field tests to determine performance of weed control equipment.
Agr. Eng., Agron. 1208. Coop. ARS.
- Minn. Forage Crop Production and Management.--1. Methods of Obtaining Stands. To determine the best techniques in establishment and management of grasses and legumes for pasture and hay.
Agron., Pl. Gen., Soils, A.H., D.H. 1302-1. Coop. SCS.
- Minn. Forage Crop Production and Management.--2. Pasture Renovation Studies. To determine best techniques in establishment and management of grasses and legumes for pasture and hay.
Agron., Pl. Gen., Soils, A.H., D.H. 1302-2. Coop. SCS.
- Minn. Forage Crop Production and Management.--3. Rotation and Supplementary Pastures. To determine best techniques for establishment and management of grasses and legumes for pasture and hay.
Agron., Pl. Gen., Soils, A.H., D.H. 1302-3. Coop. SCS.
- Minn. Forage Crop Production and Management.--4. Observation Testing of New Species of Legumes and Grasses. To determine best techniques in establishment and management of grasses and legumes for pasture and hay.
Agron., Pl. Gen., Soils, A.H., D.H. 1302-4. Coop. SCS.
- Minn. Forage Crop Production and Management.--5. Hay Mixtures and Production Methods. To determine best techniques in establishment and management of grasses and legumes for pasture and hay.
Agron., Pl. Gen., Soils, A.H., D.H. 1302-5. Coop. SCS.
- Minn. Factors Influencing the Properties and Market Qualities of Concentrated and Dry Milk Products.--5. Drier Design. To (1) secure fundamental data on many factors in drying operation as: actual drying rate, effect of particle size on drying rate, effect of air temperature and humidity, effect of absolute pressure in system, and effect of air velocity on drying rate; and (2) design improved drying apparatus.
D.H., Biochem. 1608-5.
- Minn. Studies of Harvesting, Handling, Storage and Marketing of Table Stock Potatoes.--1. Studies on the Relation of Harvesting and Handling Operations and Storage Conditions to the Market and Culinary Quality of Potatoes. To improve the market and culinary quality of potatoes grown in the Red River Valley.
Hort., Agr. Eng., Pl. P., F.H. 2118-1. Coop. BPI.
- Minn. Studies on Harvesting, Handling, Storage and Marketing of Table Stock Potatoes.--2. Studies on the Improvement of Potato Harvesting, Handling and Storage Equipment. To improve the market and culinary quality of potatoes grown in the Red River Valley.
Hort., Agr. Eng. 2118-2. Coop. BPI.

- Minn. Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage.—1. Soybeans, Corn and Cereal Grains. To determine (1) mold population of commercial lots of corn, soybeans, and cereal grains of different market quality; (2) main factors influencing growth of molds on storage grains; and their effects; (3) if mold assays might be useful as additions to criterium of quality; and (4) which promising compounds can be used as inhibitors of molds on stored seeds.
Pl. Path. and Bot. 2220-1.
- Miss. Farm Mechanization as Related to Hill Section of Mississippi. To (1) study adaptation of various combinations of machines that may be used in mechanical production of corn, cotton, and other row crops in hill section; (2) develop and adapt new machines for production of corn, cotton and other row crops; and (3) study effect of date of harvest, plant characteristics, and field conditions on efficiency of row crop harvesters and to adapt or modify those harvesters to increase efficiency.
Agr. Eng. FB-1
- Miss. Equipment for the Economical Placement of Seed and Fertilizer in Sod. To (1) design, construct, or adapt machinery for fertilizing and seeding pasture crops in a pasture sod, (2) design, construct, or adapt equipment for research studies for sod seeding on small plots, (3) study sod seeding as a soil and water conservation practice, (4) study mechanical ways of rendering vegetation dormant for early fall seeding.
Agr. Eng., Agron. FB-3.
- Miss. Mulch Farming Requirements. To study (1) equipment needs and adapt or design equipment satisfactory for producing crops in mulch; (2) crops, spacing and fertilization needs of said crops for economical production by mulch methods; and (3) additional water requirements for crops, if any, due to mulch type farming.
Agr. Eng. FB-4
- Miss. Mechanized Harvesting and Feeding of Silage. To (1) evaluate available machines as to use in mechanized feeding program; (2) store silage harvested by (a) conventional equipment, row crop harvester and other regular equipment as required, (b) bale and stored in round form, and (c) baled and stored in rectangular bales in trench silo, or upright and stacks; determining labor problems efficiency of storage and storage problems; (3) modify present equipment to handle heavy silage in bale form and modify loading equipment and unloading equipment for baled silage; (4) develop, modify and adapt transportation units so that mechanized and/or self feeding is practical; (5) determine efficiency of feed system in converting feed into beef or milk, especially automatic feeders; and (6) study feeding problem when feed is in bale form to determine necessary equipment for handling.
Agr. Eng., Dairy, A. H. FB-5.

- Miss. The Value of Irrigation in Maintaining Year-Round Pastures of High Quality. To determine value of irrigation in terms of economic yield and quality of forage by: 1. obtaining stands in drought periods; 2. determining optimum rate and frequency of application of irrigation water to maintain production; 3. determining best fertilizer rates and analyses to be used with irrigation; 4. period and amount of production of various forages to maintain continuous production of high quality forage; and 5. effect of irrigation on incidence of diseases, insects, and weeds.
Agr. Eng., Agron. FC-3.
- Miss. A Study of the Development of Equipment and Methods for the Blending of Agricultural Seeds. (1) Observe, analyze, and evaluate blending equipment and procedures. (2) Develop superior methods and equipment.
Agron., Ag. Ec., Agr. Eng. FSP-1. Coop. AMS.
- Miss. Mechanization of Production and Utilization of Selected Stored Feed and Forage Crop Enterprises. To (1) develop information from farmers on costs, extent of use, performance rates, and management practices in production of selected stored feed and forage crop enterprises, including various kinds of pastures; (2) develop similar information for processing, storing, and handling feeds in feeding of livestock on the farm; (3) assemble and appraise information of similar sort from experimental and pilot farm results pertaining to same enterprises and practices, and (4) evaluate and test out, on an enterprise and a representative farm unit basis, results obtained above for different type-of-farming areas in the state.
Ag. Ec. PA-2.
- Miss. The Effect of Cultural Practices on the Physical Property of Soils. To determine (1) efficiency with which several deep tillage methods can be used to eradicate hard pans; (2) effect of tillage practices on physical properties of clay soils; (3) effect of long time use of winter legumes on physical properties of soils; (4) effect of intensity of secondary seedbed preparation; and (5) method of eliminating harmful effects of hillside seepage.
Agr. Eng., Agron. PB-5
- Miss. Improvement of Methods and Equipment for Growing Cotton. To (1) determine efficiency of different types of stalk shredders and improve machines for stalk disposal, (2) evaluate methods of seedbed preparation and learn effect of different methods of preparation on stand, weed control and crop yield, (3) learn effects of several deep tillage methods on hardpan soils of the Yazoo-Mississippi Delta, (4) learn effect of different openers and planting methods on stand and yield with special reference to improved seed germination and stands in heavy clay soils of the Yazoo-Mississippi Delta, (5) test, evaluate, and improve new or experimental equipment for field application of both liquid and granular fertilizers, (6) design, test, evaluate, and improve machines and techniques for the application of both pre- and post-emergence herbicides, (7) test, modify and improve mechanical methods of weed control, including flame cultivation equipment, and (8) evaluate and improve machines and methods for controlling cotton insects with particular emphasis on efficiency of application and adaptability of equipment for multiple uses.
Agr. Eng., Agron. RRFU-2-a. Reg. S-2.

Miss. Improvement of Methods and Equipment for Defoliating and Harvesting Cotton. To (1) determine most effective stands and plant spacing for mechanical cotton harvesting in the Delta area, (2) evaluate cultivation and weed control practices and develop methods for efficient mechanical harvesting, (3) test and improve methods and equipment for the application of defoliants and to determine the effect of defoliation on mechanical picking efficiency and quality of machine picked cotton, (4) study the mechanical characteristics of basic types of mechanical pickers and to determine their effectiveness under similar conditions, (5) determine amount of water actually added to seed cotton during the picking operation and its ultimate effect on seed cotton storage and quality of lint, (6) investigate and locate causes of large concentrations of leaf trash and other foreign matter in mechanical cotton picker storage baskets, and (7) evaluate performance of mechanical pickers in commercial and advanced experimental varieties of cotton grown in the Mississippi Delta Area.

Agr. Eng., Agron. RRFU-2-b. Coop. ARS. Reg. S-2.

Miss. Correlation of Regional Projects on Cotton Mechanization. To correlate projects, analyze and disseminate information on the various projects being conducted on the Cotton Mechanization Regional Study,

Agr. Eng. RRFU-2-d. Reg. S-2

Miss. Incidence and Severity of Mechanical Scarification and Injury to Seeds During Processing, Grading and Handling Operations. To (1) learn frequency and extent of scarification and/or mechanical damage to seed as they are subjected to various processing activities, (2) evaluate influence of these actions on germination and vigor of seedlings, on the hard seed content of certain legumes, and on productivity of the resulting plants, and (3) learn means by which scarification or injury to seeds during the processing operation may be reached.

Ag. Ec., Agron., Agr. Eng. ES 396

Miss. The Modification and/or Development of Specific Seed Processing Equipment. To (1) modify equipment to increase accuracy of cleaning; separation and grading operations needed to market high quality seeds for planting purposes; and facilitate clean-outs and equipment adjustments necessary to prevent varietal mixtures of the increasing numbers of varieties; (2) develop principles, methods, and equipment for separation of certain seed mixtures not now separable, or uneconomical to separate; (3) develop model or lab. cleaning equipment to clean, separate, and grade seed in a manner comparable to the commercial processing equipment now in use.

Ag. Ec., Agr. Eng., Agron. ES 434.

Mo. Forage Harvesting, Handling, Storage and Feeding.---a. Design of Grass Silage Structures for Efficient and Economical Storage and Feeding. To determine the magnitude of lateral stress of silage when packed in above-ground horizontal silos, and with this information design various types of retaining walls for the construction of such above-ground silos.

Agr. Eng. 138-a

- Mo. Forage Harvesting, Handling, Storage and Feeding.--b. Handling Silage Crops When Harvesting and Feeding. To study the various methods and machinery used in handling silage, with particular emphasis on those operations performed when silage is fed from horizontal silos.
Agr. Eng. 138-b.
- Mo. Forage Harvesting, Handling, Storage and Feeding.--c. Harvesting, Processing and Feeding Forage as Hay. To study (1) methods of storing and feeding hay in the field; and (2) methods of curing baled hay by ventilating with unheated air.
Agr. Eng. 138-c.
- Mo. Research in Control of Weeds.--a. Equipment and Procedures in Spraying for Control of Weeds and Brush. To (1) explore development and improvement of equipment and methods for use of chemicals in weed control in beans; (2) study possibilities of cooperation between rural electric cooperatives in brush control along right-of-ways, to better appraise newer equipment and methods of applying herbicides; and (3) study effect of concentration and volume of herbicides used on toxicity of materials to both crop and weed plants, for more information on costs and effectiveness of applications at various concentrations.
Agr. Eng., Field Crops, For. 153-a. Coop. USDA.
- Mo. Farm Tractor Fuels. To (1) determine effect of different sizes of gasoline storage tanks, color of tanks, shading of tanks, and use of pressure vents on tanks, upon evaporation losses and on deterioration in quality of gasoline; and (2) summarize and publish results of survey of tractor costs and tractor fuel costs, and results of lab. tests on liquified petroleum gas as a tractor fuel.
Agr. Eng. 224
- Mo. Grain Drying. To (1) study operating characteristics of grain drying systems, with emphasis on distribution of air in grain mass; and (2) obtain further data on conditioning of ear corn with unheated air.
Agr. Eng. 225.
- Mo. Corn Production in Intensive Rotations with Small Grain. To learn (1) use of corn and compare it with other crops for use in intensive 2-crop, 1-year rotations, (2) methods and ways of improving techniques of quickly preparing seedbeds and planting corn and comparison crops following harvesting of small grain, (3) earliest stages of maturity practical for harvesting of crops which will be followed by other crops in intensive rotations, (4) methods and to improve techniques of early harvesting of corn and comparison crops.
Agr. Eng., Field Crops 272
- Mont. Improvement of Dryland Tillage Equipment for Soil and Water Conservation. Improve dryland tillage implements and/or design new implements involving new principles of tillage in order to keep stubble and trash on top of soil, reduce moisture loss during tillage operation, reduce power required, reduce wind and water erosion.
Agr. Eng. 28.

- Nebr. Investigation of the Power, Labor, and Machinery Requirements for the Production of Corn in Nebraska. To get better soil erosion control, better weed control, and better yields by adapting power, labor, and machinery to corn production, utilizing the best agronomic information and regional influencing factors.
Agr. Eng. 281.
- Nebr. Methods and Equipment for the Preservation of Grain and Forage on the Farm.--B. Hay Drying. To (a) develop an instrument for quickly determining with reasonable accuracy the moisture content of hay in bales, and (b) study methods and equipment suitable for drying hay on the farm.
Agr. Eng. 307-B
- Nebr. The Use of Tempered Air for Conditioning Grain in Bulk Storage. To compare rates of drying, energy requirements for drying, weight changes and differences in quality when grain is conditioned in bulk storage by forced circulation of (1) untempered ambient air, (2) ambient air tempered to a relative humidity of 50 percent by recirculation of moist air in periods of low ambient humidity, (3) ambient air tempered to maintain relative humidity between 50 and 60 percent by recirculation of moist air in time of low ambient humidity and addition of heat during time of high ambient humidity.
Agr. Eng. 498. Coop. ARS. Reg. NC-23.
- Nebr. Evaluation of Factors Affecting the Efficiency of Gaseous Powered Irrigation Pumping Plants. (1-2) Learn rate of change in efficiency of irrigation pumps and in specific fuel economy and power stability of gaseous-fuel engines used to power pumps. (3) Obtain operational records to supplement test data obtained for use in estimating maintenance costs of pumps and fuel engines. (4) Learn effect of variations in pumping head on performance of pumping plants.
Agr. Eng. 503.
- N.J. Economics of Growing, Harvesting and Storing Forage. To obtain new and up-to-date facts on the economics of modern methods of production, harvesting and storing roughages, as observations show that development of new machinery has revolutionized the most profitable optimum of farm business organization, and new facts are needed to define requirements of forage production, size of business, capital investment and labor requirements in modern scientific farming.
Agr. Ec. 39. Reg. NE-18.
- N.J. Engineering Investigations in the Harvesting, Curing and Storage of Hay, with Particular Reference to Artificial Drying. To improve the efficiency of hay drying systems.
Agr. Eng. 53. Reg. NE-13.
- N.J. The Development of a Suitable Electrical Moisture Meter to Determine the Moisture Content of Forage and Grains in the Field. To develop (1) suitable electrode to make numerous successive readings of moisture content on forage and integrate them into a representative value; and (2) present grain electrode and calibrate it for the grains, including an investigation of temperature of calibration.
Agr. Eng. 58. Reg. NE-13.

- N.M. Efficiency of the Improved Methods in Harvesting and Use of Seeded Forage Crops. Compare physical and economic in-puts and out-puts of different improved methods and machines used in harvesting. Study relationship of different harvesting methods on ways forage is utilized and interrelationships among types and sizes of operations and alternative methods of harvesting and utilizing. Evaluate findings on net farm income under varying price-cost conditions.
Ag. Ec., Agr. Eng. 38. Reg. W-36
- N.M. Development of Improved Methods and Equipment for Planting, and Late Weed Control in Cotton Production. To develop or modify (1) a planter opener and covering device to plant at uniform depth, prevent dry soil from being deposited around seed, prevent void space from remaining in soil around seed, reduce lateral placement of seed to minimum, and partially prepare seedbed during planting operation; and (2) equipment and methods for complete weed control.
Agr. Eng. 42. Reg. W-24.
- N.Y.
(Cornell) The Mist Concentrate Method for Applying Fungicides to Fruit Trees, With Consideration Given to Spray Formulations, Phytotoxicity, and to Modification of Application Equipment. To (1) gain more specific information on the formulation of the spray mixture and its influence on both the efficiency of the methods for disease control and on phytotoxicity, for instance as savings in amount of toxicant materials required, and study of formulations with respect to adjuvants added; (2) determine the feasibility of concentrating the newer fungicides as they become available, as many have already proved effective but have not been adequately tested in the mist concentrate method, nor has the method been adequately tested on all fruit crops with the materials which are effectively applied to a few; and (3) study needed modifications in the equipment, as growers are anxious that the fixed-outlet machine developed under this project be constructed so that the spray may be delivered to both sides of the machine at once, which will require research to determine if it is feasible, and if so, how best to accomplish it; also to reduce hydraulic pressure on the spray and still obtain adequate atomization.
Pl. P., Agr. Eng., Ent. 4
- N.Y.
(Cornell) The Basic Requirements and Design Principles of Mechanical Equipment for Control of Insects, Diseases and Weeds. To Study the requirement of mechanical equipment for pest control practices with the objective of determining basic information necessary to design new or to modify existing available equipment for practical use. To design and construct equipment for experimental use for the purpose of determining practical control measures and suitable machinery. Assemble information necessary to design sprayers for weed control in row crops, open fields, and lawns. Machines to be capable of applying concentrated herbicides at the rate of as low as one gallon per acre. Experimental machines built and used for field tests. Recognized procedures for plot testing shall be followed. Cooperating department will provide the herbicides and supervise the layouts of plots and measurements of material efficiency.
Veg. Cr., Ent., Pl.P., Flori., Agr. Eng. 14

- N. Y.
(Cornell) An Investigation of Methods for Improving the Quality and Economy of Production of Feed Crops in the Principal Soil and Climatic Regions of New York State.--II. Corn Investigations. To improve efficiency of corn production by decreasing costs per bushel of grain or ton of silage and by decreasing storage losses.
Agron. 38-II
- N. Y.
(Cornell) Drying of Grain, Legume and Grass Seeds, Beans, Forage Crops, and Other Farm Products. To (1) determine fundamental biological factors involved in drying of farm crops and seed; (2) determine type or types of equipment, including use of supplementary heaters and drying agents, best suited for economical drying of farm crops and seed in New York; and (3) design, build, and test drying equipment that will make possible the retention of a greater percentage of the original and desirable characteristics of farm crops.
Agr. Eng. 40
- N. Y.
(Cornell) The Adaptation and Development of Farm Equipment for the Efficient Handling and Processing of Diverse Products from the Farm Woodlot. To (1) promote sound woodlot management for more New York state farm woodlots; (2) increase cash income from farm woodlot; (3) enable farmer to harvest his woodlot crop with minimum of effort and time and with existing or adapted farm equipment; (4) provide more of farm's need of fiber and organic matter for litter, bedding, and soil humus; (5) up-grade woodlot products by farm processing to create a more salable product with greater value; (6) provide higher standard of living for "hill" farmers; and (7) provide easily handled, cheap fuel in areas where oil and coal are high.
Agr. Eng. 41
- N. Y.
(Cornell) A Study of Materials Handling Methods and Equipment Including Farm Storage Facilities for Reducing Labor in Livestock Management. To develop suitable methods and equipment for handling materials necessary for livestock feeding and care in order to reduce manual labor now required so that it should be possible to increase the output per man, hence reduce unit cost of production.
Agr. Eng. 52
- N. Y.
(Cornell) A Study of the Factors Affecting the Efficiency of Potato Spraying and Dusting. To find better materials and methods of spraying potatoes.
Pl. Path. 79,1
- N. Y.
(Cornell) Factors Influencing the Preservation of Roughages.--II. A Study of the Sources and Control of Nutritional Losses Occurring During the Harvesting and Storage of Hay and Silage. To (1) determine relative magnitude of nutritional losses occurring as a result of respiration, leaching, leaf shattering, and other causes when various forage crops are made into hay and silage; (2) find ways to minimize field and storage losses when forage crops are made into hay and silage; and (3) determine better methods of producing high quality roughage from hay crops.
A.H., Agron. 98-II

- N. Y. Development of Improved Methods and Equipment for Tillage, Seeding
(Cornell) and Fertilizer Placement. To develop improved methods and equip-
ment for seed bed preparation, and seed and fertilizer placement for
vegetable and forage crops in state.
Agr. Eng., Agron. 108. Coop. USDA
- N. Y. An Economic Evaluation of the Use of Mow Driers on Dairy Farms
(Cornell) in New York. To (1) determine under what conditions it is most
feasible to use driers for barn curing of baled, chopped and loose hay;
(2) obtain costs of installing and operating mow driers and nature and
extent of repairs and changes needed since installations; and (3)
evaluate how effectively mow driers have met original purpose for which
they were installed.
Agr. Ec., Agr. Eng., Agron. 382
- N. Y. Specifications and Costs for Model Milk Pasteurizing and Bottling
(Cornell) Plants. To (1) determine effects of such factors as plant capacity,
volume, variety of products and packages, equipment type, operating
methods and schedules, etc. upon unit costs of pasteurizing and bottling
milk; and (2) establish efficiency standards for plants for different
capacities and volumes.
Agr. Ec. ES-227-a
- N. C. Weed Control Methods and Machinery. (1) Evaluate methods and
equipment for controlling weeds under varying weather and soil condi-
tions. (2) Develop equipment to provide effective control in an
efficient and economical manner.
Agr. Eng., Agron. 4. Coop. USDA. Reg. S-2
- N. C. Study and Development of Improved Methods and Machines for
Fertilizer Application. (1) To study effectiveness of present ferti-
lizer placement machinery with regard to accuracy of rate of application
and band spacing and to ease of operation; (2) design and develop a
machine for experimental plot use to measure the efficiency of differ-
ential placement of fertilizer ingredients; (3) design and develop
satisfactory machinery to meet the latest accepted methods of fertili-
zation.
Agr. Eng. 16. Coop. BPI. Reg. S-2
- N. C. Fundamentals of Tobacco Curing. To formulate basic curing
principles pertinent to development of improved methods and procedures
for processing and marketing tobacco.
Agr. Eng., Agron. 23. Coop. BPI.
- N. C. Tobacco Mechanization. To determine principles pertaining to the
mechanization of tobacco culture, evaluate their importance and apply
them toward improving present cultural practices.
Agr. Eng., Agron. 48. Coop. USDA
- N. C. Planting Methods and Machinery. (1) Evaluate effects of compon-
ents of planting machinery in terms of physical environmental factors,
seed germination and plant development. (2) Develop planting equipment
that will fulfill optimum conditions for emergence in an effective and
economical manner as determined under above objective.
Agr. Eng., Agron. 67. Reg. S-2

- N. D. Mechanical Handling of Silage and Grain from Storage to Feed Bunks in Open Feed Lots. To develop (1) plans for equipment to handle silage and grain from storage to open feed lot and automatic feeders in milking parlors; and (2) heating unit to thaw silage in upright silos, and investigate possibility of preventing freezing with use of salt and other materials.
Agr. Eng. 35
- N. D. The Development and Testing of Equipment to Measure the Resistance of Potatoes to Bruising and Injury. To develop and test equipment to measure resistance of potatoes to bruises from impact, pressure, and abrasion.
Ag. Ec., Agr. Eng., Hort. 37
- N. D. The Effect of Tractor and Equipment Operation on Traffic Soles in Farm Fields. To learn (1) if traffic soles are in various soils and if they survive winter frost action under normal field conditions, (2) depth of soles and effect on water infiltration rates, (3) best soil moisture state for working soils to avoid soles, (4) effect of cultivation of row crops on soil compaction between rows.
Agr. Eng., Soils 37
- N. D. The Cost of Performing Tractorized Farm Operations and Energy Requirements per Acre for Such Operations. To determine (1) cost of operating farm tractors when performing various farm operations; and (2) horsepower-hours of energy required to work an acre of soil with various machines under various soil conditions.
Agr. Eng., Ag. Ec. 41
- Ohio Tillage Practice in Relation to Soil Tilth and Crop Response. To (1) evaluate quantitatively the soil physical conditions produced by different tillage methods at time of tillage and to determine their longevity; (2) determine to what extent and why crop growth and yield vary with different tillage methods; and (3) obtain information on power and labor for various tillage practices used.
Agr. Eng., Agron. 38
- Ohio Eradication or Control of Weeds and Other Undesired Plants.--I. The Chemical and Cultural Control of Weeds in Field Crops. (change in '54). To study (1) use and effectiveness of chemicals alone and with tillage in weed eradication compared with tillage alone and rates, dates, and methods of application of chemicals for maximum effectiveness on weeds and minimum injury to crops; (2) effects of herbicides on seed germination, composition, palatability, and other important properties of crop; (3) reaction of different varieties of crops to herbicides; (4) to devise specific systems of treatment for major noxious weeds of the state, using chemical, mechanical, and crop competition methods or combinations of them; and (5) to study relation of crop rotations to weed control.
Agron., Agr. Eng. 71-I.

Ohio

Eradication or Control of Weeds and Other Undesired Plants. II. Chemical and Cultural Weed Control Studies with Horticultural Crops. To determine (1) if any available weed control chemicals can be used in conjunction with regular cultural practices to solve some major weed problems associated with production of horticultural crops; (2) kind of chemical best suited for use with a specific crop; (3) optimum form of chemical, time, rate and method of application for each crop under field conditions; and (4) through replicated field plot experiments, the value of these treatments with regard to weed control, and their effect on qualitative and quantitative yields of the crop plant.
Hort. 71-II. Reg. NC-14.

Ohio

A Study of the Harvesting and Storing of Corn and Small Grains. To study the Ohio grain crops in regard to the factors which insure good harvestability and storage. I. Corn. To (1) study how mechanical picking quality is influenced by various plant factors; (2) evaluate influence of weather, time of day, stage of maturity, and machine adjustment on quantity of shelled corn, husks, and silks; (3) build and test cleaning and distributor equipment to eliminate or distribute in crib the shelled corn, husks, and silks; (4) study basic shelling actions by which corn may be shelled in an effort to find a method by which immature corn may be shelled without excessive damage to the kernel; and (5) thru temperature and air flow patterns, to evaluate various crib loadings which result from distribution equipment, various machine types, various crib designs, and different degrees of cleaning. II. Wheat. To (1) establish procedure for comparing and rating wheat varieties for combining characteristics; (2) determine plant factors influencing satisfactory harvesting; and (3) make recommendations for possible machine changes which will aid harvesting. III. Soybeans. To (1) evaluate present and new varieties for field harvestability, and (2) evaluate items 2 and 3 under wheat for soybeans.

Agr. Eng., Agron. 82

Ohio

Basis for Agricultural Aircraft Equipment Design. To (1) provide basis for better agricultural aircraft solids distributor design and placement; (2) provide basis for design of metering devices, agitators, hoppers, and power source and transmission systems; (3) assemble information on spray equipment and provide basis for combination liquid and solids dispensing equipment; and (4) check lab results with controlled field studies for effectiveness of application, performance of equipment and information on application requirements, including rate, distribution, coverage, and type of material.

Agr. Eng. 83. Coop. USDA.

Ohio

Economics of Various Methods of Harvesting, Storing and Feeding Forage. To (1) determine most profitable methods to harvest, store, and feed forage under different conditions of use of forage quantity handled, amount of labor available, etc.; (2) determine and evaluate farmer reaction to more significant subjective aspects of various methods of handling forage, such as strenuousness of work, discomfort involved, etc.; (3) find ways to make use of larger quantities of forage more profitable to individuals and strengthen competitive position of sod crops in relation to soil depleting grain crop; (4) provide basis for evaluations of forage production and handling at part of over-all farm organization; and (5) devise method of reasoning that will enable a farmer to determine best method to handle forage on his farm.

Ag. Ec., Soc. 118. Coop. AMS

- Ohio. Control of Soil-Inhabiting Nematodes, Fungi, Bacteria and Insects Affecting Vegetable Crops. To (1) determine and classify soil-inhabiting organisms responsible for economic loss on vegetable crops growing in Ohio soils, (2) devise means of controlling most destructive organisms, and (3) design and test types of equipment and application techniques for use in applying various liquid and dry formulations in the control of soil-inhabiting pest complex on vegetables.
Bot., Ent., Agr. Eng. 131. Coop. ARS.
- Okla. Mechanized Cotton Harvesting in Oklahoma. Subproject IIA (1). To evaluate several methods of preparing the cotton for harvest and several dates of preparation as such preparation affects the performance of the cotton harvester and the resulting quality and new yield of cotton; Subproject IIA (2). To (1) evaluate and improve stripper roll materials, to evaluate the influence of stripper roll speed on harvester performance, and to evaluate and improve the stripper roll shielding and entrance section shielding on present commercial cotton harvesters; (2) evaluate the various methods of conveying cotton from the stripping chamber to the wagon with particular emphasis on amount of cleaning obtained by each method of conveying, and also to learn the elements of cotton conveying which affect the quality of cotton lint; and (3) evaluate and improve other functional mechanisms of the cotton stripper not referred to in the above objectives, to evaluate other machines involving new principles, and to evaluate cotton pickers for their possible application to Oklahoma conditions; Subproject IIB. To (1) evaluate harvester performance on most common varieties of cotton grown in Oklahoma; and (2) evaluate and improve harvester performance as related to different plant populations and characteristics typical of different populations.
Agr. Eng., Agron. 578. Coop. ARS. Reg. S-2
- Okla. Marketing Mechanically Harvested Cotton. To (1) analyze current practices and determine marketing problems that have developed, or are likely to develop with machine harvesting of cotton, and determine the solutions, and (2) report most efficient solutions shown by data and suggest improvement in marketing machine harvested cotton.
Agr. Ec. 611. Reg. S-1.
- Okla. Adapting and Testing Cotton Ginning Equipment and Techniques. Regional Sub-Project IV-A. To (1) test, evaluate, and improve new or experimental equipment for adaption of Oklahoma type cotton production; and (2) devise, test, evaluate and design methods and techniques for preparing, conditioning, and ginning cotton harvested mechanically under new or experimental field conditions; Regional Sub-Project IV-B. For cotton grown in (a) humid upland, (b) humid bottomland, (c) dry upland, and (d) irrigated upland. To (1) determine the combination of drying, cleaning, and extracting machinery in overhead systems; (2) determine the correlation between drying and lint cleaning; (3) determine amounts of overhead and lint cleaning equipment to be used in rough harvested cotton; and (4) study effects of cleaning on color of lint sample.
Agr. Eng. 753. Reg. S-2.

Okla. Development of Improved Machines and Methods for Seedbed Preparation, Planting, and Early Weed Control in Cotton Production. Subproject I-B. To evaluate some newer tillage tools for their place in seedbed preparation for cotton production; subproject I-C. To (1) evaluate existing seed grading equipment and determine physical measurements of cotton seeds; (2) evaluate performance of different grades of cotton seed as to emergence and yield; (3) evaluate performance of graded seed in now available planters and modify planters to exploit unique physical dimensions of seed; (4) evaluate planter performance in obtaining different plant populations; (5) study beneficial effects of planting seed at different depths; (6) evaluate and improve present furrow openings on cotton planters; (7) evaluate and improve seed bed profiles as they may promote more rapid and better emergence; and (8) evaluate available covering devices now used; Subproject I-D. To (1) determine influence of machines and chemicals now available for early weed control; (2) find influence of plant population on number of weeds and ease of controlling weeds; and (3) improve seedbed profiles to minimize early season weed control problem.

Agr. Eng. 802. Reg. S-2.

Okla. Design, Development and Testing of Fertilizer Placement Machinery. To (1) develop experimental machines and methods for placing fertilizers at various rates, spacing, and depth for row and drilled crops, permanent and temporary pastures, and specialized crops; (2) testing experimental machines and methods in several crop areas, soil types, various moisture conditions, and fertility levels to determine crop response to spacing, depth, amount, kind and time of fertilization; and (3) develop prototype machines for fertilizer placement based on findings in (2).

Agr. Eng., Agron. 815.

Okla. Marketing Practices and Harvesting Methods Affecting Cotton Quality and Net Income from Cotton in Oklahoma. To learn (1) cultural practices followed that affect cotton quality, quantity, price and income from cotton marketed in Oklahoma, (2) effect of defoliation on cotton quality, price and income, (3) effect of harvesting methods used on quality and income, (4) effect of marketing practices followed, as type of vehicle used for hauling, (5) combined effect of pre-harvest field preparation, defoliation, harvesting methods and marketing practices on net income from cotton, per bale, acre, and farm.

Ag. Ec., Agron. 907

Oreg. Physical and Economic Evaluation of Selected Methods of Harvesting and Handling Forage Crops in Western Oregon. Compare economic efficiency of "daily ration" system of grazing, green chopping, and ensiling by learning (1) effect of method of harvesting and handling on quantity and quality of forage produced; (2) relative capital outlays and investment costs for 3 alternative methods of harvesting and handling forage; (3) for each method, the physical requirements and operating costs incident to harvesting and handling material; (4) relationship of different methods of forage harvesting and handling to total farm organization, scale of operation, and systems of livestock management; (5) to pinpoint limitations and problem areas in studied practices and methods which may require engineering research in developing new machinery or equipment.

Ag. Ec., Agron. 263, Coop. PERB. Reg. W-36

- Oreg. Improving the Efficiency of Handling, Storing and Marketing Oregon Potatoes. To determine practical methods of improving labor and equipment efficiency in handling, packing, storing and shipping of Oregon potatoes.
Ag. Ec., Agr. Eng., ES 303
- Pa. Methods of Preservation and the Measurement of the Nutritive Values of Forage Crops.--E. The Nutritive Value of Hay as Affected by the Method of Curing. To determine (1) if it is feasible to bale hay at moisture higher than 20 percent, which is safe for good keeping in storage, by adding a preservative agent at time of baling or storage; (2) best method to apply sodium bisulfite at baling to insure uniform distribution thru the bale; and (3) by nutritive evaluations if addition of sodium bisulfite results in enough saving of feed nutrients present in forage to justify additional cost and application.
An. Nutr., Agron., Agr. Eng. 1016-E
- Pa. Handling Chopped Forage. To (1) evaluate present methods and devise new methods for handling chopped hay and corn from field to mow or silo; (2) further perfect method of using mechanical conveyors suitable for dried, wilted, and green chopped forages; and (3) develop a general purpose wagon box for transporting chopped forages along with a suitable and practical wagon unloader.
Agr. Eng. 1053
- Pa. Tillage Tool Design and Performance. To improve design and performance of tillage tools by getting the information on soil resistance to them and relating this to design and control of tools, and (2) evaluate methods of plowing and seedbed preparation for corn and potatoes, considering yield, cost, suitability for stony land, and relating weed, insect and erosion control.
Agr. Eng. 1083
- Pa. Air Distribution in Drying Hay and Grain. To (1) improve performance of hay and grain driers by studying ways of getting better distribution of air thru material being dried; and (2) develop improved technique for measuring air distribution in hay and grain.
Agr. Eng. 1198. Reg. NE-13
- Pa. The Agricultural Engineering Aspects of Deep Tillage of Pennsylvania Soils. (1) Study and evaluate applicability of various types of deep tillage equipment and equipment for deep placement of lime, fertilizers, and other chemicals. (2) Learn draft requirements and vertical soil resistance for subsoiling various soils at depth of 12, 18 and 24 inches, and spacing of 1, 2, 3 and 4 foot widths.
Agr. Eng. 1260-B. Coop. SCS
- Pa. Specifications and Costs for Model Milk Pasteurizing and Bottling Plants. To (1) determine effects of such factors as plant capacity, volume, variety of products and packages, equipment type, operating methods and schedules, etc., upon unit costs of pasteurizing and bottling milk; and (2) establish efficiency standards for plants of different capacities and volumes.
Ag. Ec. ES 227-b.

- Puerto Rico The Economics of Machinery, Power, and Labor in Forage Production and Use for Beef and Dairy Cattle. To (1) determine best and most economical types of equipment for production and harvesting forage crops; (2) evaluate adaptability of different equipment, machinery and labor for different systems of livestock management; and (3) investigate potentialities of use of machinery as a means of increasing farm income.
Ag. Ec. 213. Reg. S-27
- Rhode Is. An Economic Analysis of Alternative Pasture Harvesting Methods and Feed Combinations in Milk Production. To (1) study input-output relationship associated with alternative methods of harvesting pasture crops; (2) evaluate effect of alternative harvesting methods on milk production; (3) analyze variations in milk production in similar groups of cows fed different combinations of forage and grain; and (4) obtain physical and economic inputs and outputs for various types, forms, and combinations of forage crops on selected dairy farms.
A.H., D.H., Agron. 14. Coop. ARS. Reg. NE-18.
- S.C. Roughages for Dairy Cattle. To study (1) methods of production, preparation and preservation of roughage crops and ascertain their feed value, (2) crops best suited to the state, and (3) value of winter and summer grazing crops and perennial legumes.
D.H. 6.
- S.C. Harvesting Cotton Mechanically in the Piedmont and Coastal Plains Areas of South Carolina. To (1) evaluate and improve a. machines and methods for preparing the cotton crop for mechanized harvest, and b. machines and methods for mechanical harvesting, (2) evaluate mechanical harvester performance in relation to plant characteristics, and (3) investigate possibilities of removing the cotton from the plant by principles other than the conventional ones now being used.
Agr. Eng. 10. Coop. ARS. Reg. S-2
- S.C. Harvesting Small Seeded Legume and Other Forage Plant Seed Crops. To determine most efficient method of harvesting forage plant seeds.
Agr. Eng. 34
- S.C. Improving Efficiency in Irish Potato Packing House Operations. To (1) determine labor and equipment requirements in potato packing houses; (2) test and evaluate alternative means of using labor and equipment in preparing potatoes for market; and (3) determine most efficient use of labor and equipment in potato packing house operations.
Ag. Ec. 46. Coop. BAE, BPI. Reg. SM-9
- S.C. Developing a High Speed Mechanical Peach Pitter for Southeastern Freestone Peaches. To develop a high speed, or large volume freestone peach pitter which would be low in cost, efficient in use, and simple to operate, for use by commercial canners, freezers, and other peach processors.
Agr. Eng., Hort. 68

- S.D. The Use of Crop Drying and Crop Conditioning Machinery and Equipment for South Dakota Crops. (1) Test practicability of conditioning wheat in storage by small electric motors and single air distribution ducts. (In cooperation with Commodity Research Division, Grain Branch, on CCC wheat in storage.) Minimum requirements of air flow and tube size will be learned. (2) Develop equipment for coordinating and comparing drying of crops in typical farm buildings as compared to carefully controlled conditions of experimental crop drying. (3) Equip a building and arrange equipment suitable for controlled drying tests on grain and hay crops. (4) Make available all crop drying equipment for careful research tests and for drying of crops under field conditions.
Agr. Eng., Ag. Ec. 246
- Tenn. Investigations in Structure and Mechanical Equipment for Storing, Drying and Handling Hay. To determine some optimum relationships of drying factors affecting the efficient use of heat, factors affecting color loss of hay in storage, and the adaptations of elevators, storage units, and hay moving devices, especially as applied to round storage bins. It is an attempt to provide a very efficient all mechanized hay drying and storage unit.
Agr. Eng. 9. Coop. TVA
- Tenn. Development of New and the Improvement of Existing Instruments and Techniques for Measuring Properties of Cotton. Develop instruments that will effectively utilize the "rapid methods for measuring physical properties of fibers". Study and attempt to improve existing instruments. Develop and refine testing techniques.
Physics 22. Reg. S-1
- Tenn. Rapid Methods for Measuring Lengths and Other Properties of Cotton Fibers. To determine (1) the adaptation of the photo-electric cell to the measurement of the length of lint in ginned cotton; (2) the value of the clamped-silver-weight method for determining the final length statistic; and (3) to develop a rapid method of measuring fineness.
Physics 32.
- Tenn. Food Processing Machinery Development. To develop (1) jumbo sweet potato cutter and sizer; and (2) automatic okra butt end trimmer.
Agr. Eng. 46
- Tenn. Harvesting and Processing of Grass and Legume Seeds Under Southern Conditions. To (1) study several methods and machines now used in production and harvesting of grass and legume seeds and to determine their relative value; and (2) develop improvements in techniques and modify, design and construct test equipment or machinery to contribute to effective commercial legume and grass seed production, harvesting and processing.
Agr. Eng. 58. Coop. TVA

- Tenn. Investigations in the Improvements of Sprayers and Non-Solid Fertilizer Distributors. (1) Improve field type liquid spreaders such as sprayers and liquid fertilizer distributors including pressurized and non-pressurized liquids. (2) Develop liquid spreaders for use on rolling or uneven land where it is hard to maintain a constant speed.
Agr. Eng. 91
- Tenn. Relative Costs and Effects on Quality and Market Value of Hand Capping and Machine Capping of Strawberries for Processing. To (1) learn relative costs of hand capping strawberries in the field and machine capping them in the processing plants, (2) compare quality and wastage of strawberries capped by the 2 methods, and (3) learn effects of refrigerated storage on strawberries capped by the 2 methods.
Ag. Ec., Food Tech. ES-385
- Texas The Development and Improvement of Machines and Methods Used in the Mechanization of Cotton Production, Harvesting and Processing in Texas. To design and improve machines and develop methods which will reduce manpower needs to a minimum and increase output per laborer to a maximum with respect to the growing of cotton by the evaluation and improvement of machines and methods.
Agr. Eng., Agron. 601. Reg. S-2
- Texas Economic Aspects of the Mechanization of Cotton Production and Competing Enterprises in Selected Areas. To (1) learn effects and efficiency of certain desiccants and defoliants on yield and quality of cotton, (2) evaluate relative cost of harvesting cotton mechanically after using harvest-aid chemicals as compared with hand-harvesting, (3) learn factors which contribute to successful use of mechanical strippers.
Ag. Ec., Pl. Phys., Path. 606. Coop. PERB
- Texas Treatment of Onions to Extend the Marketing Period. To (1) develop a commercially practical infra-red post harvest onion treatment; (2) construct an experimental moving belt-type infra-red onion treating apparatus; and (3) determine any detrimental effects a standardized infra-red treatment may have on keeping quality of untested commercial varieties.
Pl. Phys., Path., Ag. Ec., Hort. 665
- Texas Spraying Equipment for the Control of Cotton Insects and for Defoliation. To (1) improve spraying equipment in efforts to obtain better distribution of chemicals for control of pink bollworm; (2) determine nozzle type, arrangement and spacing to give optimum spray patterns for insect control including pink bollworm and for defoliation of cotton plants; and (3) check insect infestations to determine effectiveness of insecticidal applications with various types and arrangements of nozzles on booms and effects of chemical removal of foliage of cotton on full populations of insects, especially overwintering of pink bollworms in unharvested material.
Agr. Eng., Ent. 722

Texas Marketing Efficiencies, Costs and Quality Improvement of Grains in the Gulf Coast Area as Affected by Farm Drying and Storage. To (1) make marketing study of economies involved in farm drying and storage of rice and grain sorghums in comparison with grain disposal immediately after harvest; and (2) determine effectiveness of recently installed mechanical drying and aeration equipment for improving quality of grain immediately after harvest and for maintaining quality during storage.
Agr. Ec., Agr. Eng. 940. Coop. AMS, ARS.

Texas Drying and Storing Sorghum Grains in Farm Storage Bins in South Texas. 1. In drying with unheated air, to determine effect of various rates of air flow thru stored grain of different initial moisture contents and at various depths on the following: rate of moisture removal, power needs, germination, infestation by microbiological organisms, fat acidity, and market grade; to modify existing air distribution systems as indicated by previous research and check uniformity of air distribution throughout the mass of grain; and to revise operating procedures for drying grain with unheated air; 2. In storing dry grains: learn minimum air flow needs for maintaining high quality grain with mechanical ventilation; establish operating procedures and use of automatic controls for aerating grain during storage; learn practical and economical methods of handling grain in and out of storage; learn effective means of controlling insects; and learn effects of moisture, temperature and different storage procedures on microbiological infestation.
Agr. Eng., 1001. Coop. AMS, ARS

Texas Drying and Storing Rice in Farm Storage Bins in Texas. Drying with unheated air. To (1) determine effect of rates of air flow thru stored rice of different initial moisture contents and at various depths on: rate of moisture removal, power needs, germination, infestation by microbiological organisms, fat acidity, milling quality; (2) modify present air distribution systems as indicated by research, and check uniformity of air distribution throughout the rice; (3) revise operating procedures for drying rice with unheated air. Storing dry rice. To determine (1) practicability of using forced ventilation for maintaining quality during storage; (2) effective means of controlling insects; (3) practical and economical methods of moving rice during drying and in and out of storage; and (4) effects of moisture, temperature and different storage procedures of microbiological infestation.
Agr. Eng., Agron. 1002. Coop. AMS, ARS

Vt. The Mechanical and Structural Aspects of Harvesting, Curing, Housing, and Removal from Housing of Grain, Hay, Silage, and Bedding. To develop methods of handling which will result in 1. reduced labor, 2. reduced capital investment in building, 3. reduced fire hazard in storage, 4. improved quality of hay by mow curing as against field curing, and 5. reduced field losses due to inclement weather.
Agr. Eng. 106.

- Vt. The Planning and Coordination of Research Under Regional Project NE-13, The Mechanization of Forage Crop Harvesting, Processing, Storing and Feeding. To further regional research on determination of the job and mechanical needs and develop methods and equipment for production of quality forage with special reference to the operations of: harvesting, processing, storage, and feeding, by serving as trustee for 9b3 funds allotted for the planning and coordination of NE-13.
Agr. Eng. Reg. NE-13
- Va. Tillage and Machinery Problems in the Application of Soil and Water Conservation Practices. To develop suitable tillage practices for the effective application of mulch culture principles in the various geographical areas of the state, including determination of the machinery problems involved, the construction and testing of experimental models and the modification of existing equipment. To study the operating characteristics of existing farm machines in connection with the application of conventional soil and water conservation practices, and to devise where possible, ways and means of overcoming critical deficiencies in their present operating capabilities.
Agr. Eng. 8302. Coop. SCS.
- Va. Specifications and Costs for Model Milk Pasteurizing and Bottling Plants. To (1) determine effects of such factors as plant capacity, volume, variety of products and packages, equipment type, operating methods and schedules, etc. upon unit costs of pasteurizing and bottling milk; and (2) establish efficiency standards for plants of different capacities and volumes.
Ag./Ec. ES-227-C.
- W. Va. Weed Control in Corn. 1. To determine and demonstrate effective methods of weed control in corn, under W. Va. conditions. 2. To study chemical weed control as related to type of herbicide, concentrations employed and time and frequency of application in corn. 3. To compare cultural methods of weed control including flame cultivation, with chemical control, in corn. 4. To determine crop and weed response to the various methods of weed control. 5. To secure information on the economic losses caused by weeds and the cost of control methods in corn.
Agron. 22
- W. Va. The Mechanization of Forage Crop Harvesting, Processing, Storing and Feeding. To determine mechanical requirements and develop methods and equipment for production of high quality forage with special reference to operation of harvesting, processing, storing, and feeding.
Agr. Eng., A.H., D.H. 48. Reg. NE-13
- W. Va. Determination of Factors Influencing the Drying Rates of Grains. To determine (1) limitations on removing moisture from grain, (2) critical temperatures, air volumes, humidities, air velocities, time factors, and (3) effect that drying conditions have on germination.
Agr. Eng., Chem. Eng. 55

Wisc. Ways of Reducing Labor Costs and Improving the Quality of Milk.--
Pipe-Line Milking, Bulk Milk Handling, Labor Saving Dairy Barns, and
Equipment. To (1) answer farmers' questions on what kind of bulk milk
cooler to buy; more information is needed on relative merits and
operating characteristics of direct expansion and ice bank coolers,
giving careful consideration to such variables as air or water coolants,
milk house temperatures, power demand, and possible use of off-peak
electric service; (2) make a careful study of effect of conversion to
bulk milk on milk house equipment and milk house size and design, with
recommendations and plans to complete this phase, (3) study effect of
conversion to bulk milk cooling and C.I.P. pipe-line milking as it
creates a waste disposal problem under each of these sets of conditions:
C.I.P. pipe-line in stanchion barn, and C.I.P. pipe-line in elevated
stall milking parlors; study waste disposal problem and develop suitable
disposal methods; and (4) study needs and preparation of barn designs to
accommodate: C.I.P. pipelines in stanchion barn, C.I.P. pipeline with
herds housed in stanchion barn and milking done in elevated stall
parlor; and C.I.P. milk line milking in elevated stall parlor with
cows under loose housing.

Ag. Ec., D. Fd., D.H., Bact. 408e. Reg. NC-23

Wisc. The Preservation of Forage Crops. To develop better methods of
preserving forage crops (hay crops) so as to reduce losses.
Agr. Eng. 522

Regional Projects

NC-10

Eradication or Control of Weeds and Other Undesirable Plants.

To devise or discover and improve means of eradicating or controlling undesirable plant growth with maximum efficiency and minimum injury to associated desirable plants, animals and man. The areas involved are in field crops, vegetable crops, gardens, cultivated lands, pastures, lawns, cemeteries, recreation areas, roadsides, forests, rights-of-way, wasteland, drainage and irrigation ditches, storage banks, conservation and other vegetative areas, and other locations where weeds are a problem.

Cooperating stations and agencies: Federal-grant projects - Ohio.

NC-23

Requirements and Design of Structures and Related Equipment for Unified Farmstead Operations.

(1) To establish and conduct investigations in the area of Farm Buildings and related equipment sufficient in scope that the various phases of structural design, production requirements, environment, materials handling, labor efficiency, and mechanisms may be studied in detail and coordinated into recommendations for efficient farmstead operations. (2) To define the areas of research needed for planning of unified operations within the farmstead as follows: a. control of environment within structures; b. efficient labor, management, and mechanization for handling, processing, and storing livestock feed, forage, and bedding, and removing manure; c. efficient labor management and mechanization for animal production and handling, storing, processing, and controlling quality in harvested food crops, and animal products; d. performance and requirements of structural materials and their application to design in the development of buildings and related equipment. (3) To initiate specific sub-projects insofar as resources permit, that will outline work planned for the areas of research described under objective 2.

Cooperating stations and agencies: Federal-grant projects - Ind., Minn., Nebr., Wisc.; and ARS.

NE-13

The Mechanization of Forage Crop Harvesting, Processing, Storing and Feeding. To determine the job and mechanical requirements and develop methods and equipment for the production of quality forage with special reference to the operations of:

(1) harvesting, (2) processing, (3) storage, and (4) feeding.

Cooperating stations: Federal-grant projects - Conn. (Storrs), Maine, Maryland, Mass., New Jersey, Pa., Vt., W. Va.

NE-13 Economics of Forage Production and Utilization. (1) To examine and describe the present patterns of production, harvesting and utilization of forage crops in different land areas; (2) To analyze the physical and economic input-output relationships of forage production; (3) To analyze the physical and economic input-output relationships of forage utilization; (4) To analyze the economic effect of alternative combinations of forage production and utilization on farm businesses with different resources and with different market outlets.

Cooperating stations and agencies: Federal-grant projects - Maine, N.J., R.I.; and ARS.

S-2 Mechanization of Cotton Production, Harvesting, Ginning and Cleaning. (1) To design and improve machines and develop methods which will reduce manpower requirements to a minimum and increase output per laborer to a maximum with respect to the growing of cotton. (2) To design and improve machines and develop methods which will reduce manpower requirements to a minimum and increase output per laborer to a maximum with respect to the harvesting of cotton. (3) To design and improve facilities and develop methods for improvement in the storage and handling of cotton with emphasis on mechanically harvested cotton. (4) To design and improve machines and facilities for the ginning and cleaning of cotton, with emphasis on mechanically harvested cotton.

Cooperating stations and agencies: Federal-grant projects - Ala., Ark., Ga., La., Miss., N.C., Okla., S.C., Tex.; and ARS, BPI, USDA.

W-24 Improvement of Mechanized Production and Harvesting of Irrigated Cotton in the Arid and Semiarid West. (1) To develop or modify methods and equipment for planting, cultivating, and application of agricultural chemicals for cotton in irrigated soils. (2) To determine the effect on mechanical harvesting efficiency of machine adjustments, harvesting procedures, defoliation, and other cultural practices. (3) To determine the desirable cotton characteristics for mechanical operations.

Cooperating stations and agencies: Federal-grant projects - Ariz., Calif., N. Mex.; and BPI and USDA.

W-36

Efficiency in the Harvesting and Use of Forage Crops. (1)

Compare the physical and economic input-output relationships among different methods or combination of methods and machines used in harvesting forage crops; (2) Analyze the interrelationships among various combinations of harvesting and utilization methods for forage crops; (3) Investigate the effects of the different methods of harvesting on the quality of the forage produced; (4) Evaluate the effectiveness of present methods of harvesting and utilizing forage crops and determine the needs for new processes and new machines; (5) Analyze the interrelationships among the types and sizes of operation and alternative methods of harvesting and utilizing forage crops. Analyze the effects of such interrelationships on net farm income under varying price-cost conditions.

Cooperating stations and agencies: Federal-grant projects - Ariz., Calif., Hawaii, Idaho, N. Mex., Oreg.; and ARS and PERB

SESD-OD-1103
Part 3, Sec. c

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FEDERAL GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

JULY 1955

Section c
FARM STRUCTURES AND MATERIALS
AGRICULTURAL ENGINEERING



204
Compiled in the
State Experiment Stations Division
✓ U.S. Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference, certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

- Ala. Simplification of Construction and Erection Practices for Exterior and Interior Walls in Farm Homes and Evaluation of Movable Free Standing Storage Units Designed to Meet Family Needs. To (1) establish designs & construction methods for prefabricated exterior & interior walls; (2) develop pre-cutting procedures for construction elements of rural homes with particular emphasis on simplicity of design & ease of construction; (3) test & evaluate construction materials & methods suitable for exterior & interior walls in rural homes; & (4) a. determine whether free standing storage units as designed provide maximum inter-changeability, b. investigate specific requirements of size, shape, & dimensions that contribute to their proper functioning; c. establish by lab experimentation standards & designs for the construction of movable free standing storage units on basis of number & kinds of items owned by rural families as determined in Housing Survey S-8; & d. evaluate functional layout & esthetic appearance of storage units designed on the extent to which the following desirable features are considered - 1. ease & economy of construction, 2. suitability for repetitive construction, & 3. acceptability by rural group for which intended.
Home Ec., Ag. Eng. 532. Reg. S-8.
- Ala. Attic Space Ventilation and Insulation. To (1) determine effects of gable roof attic space ventilation on ceiling panel temperatures, (2) compare adequate attic space ventilation methods with ceiling insulation methods for summer control of the ceiling panel temperatures under a gable roof, & (3) determine best methods of ventilating a gable roof attic space for summer ceiling temperature control.
Eng. 558. Reg. S-8.
- Ala. Design of Utility Structures for Alabama Farms. Design, construct, & test under farm conditions utility structures adapted to needs of Alabama farms.
Ag. Eng. 563.
- Alaska Use of Alaskan Building Materials in Farm and Home Construction. To develop methods of constructing, insulating, & vapor sealing food storages, farm homes & other agricultural structures using native Alaskan materials & labor.
Eng. AL-1-4-3 (BJ)
- Alaska Insulating, Vapor Sealing, and Ventilating Farm Buildings in Alaska. To establish satisfactory ventilation and insulation standards for stall type dairy barns.
Eng. AL-1-4-11 (BJ).
- Ariz. The Production and Utilization of Tamarisk, Tamarix Articulata. To determine (1) best methods, time required, and cost of growing tamarisk, to obtain merchantable logs for the furniture trade, especially veneers; and (2) effects of varying depth and time of immersion in creosote on the durability of treated tamarisk used as fence posts.
Ag. Eng. 231.

Ark. Farm Home Improvement Through Practices and Methods for Obtaining Adequate Farm Housing at Low Cost. To determine functional requirements of farm homes to meet needs and activities of the farm family, such as space, arrangement, health needs, equipment, and facilities. Study requirements for remodeling and improving farm homes. Determine methods of using native materials and low cost commercial materials, separately and in combination, to secure adequate, attractive, and economical rural housing. Prepare and make available to farm families home plans using best combinations as shown by results of projects.

Ag. Eng. 282. Coop. BHNHE.

Ark. Space, Storage and Arrangement Requirements for a Combination Living and Sleeping Area and for Bedding and Household Linens. To determine (1) specifications for a combination living and sleeping area which are necessary to meet needs of the family in its multiple use of this space, and (2) space and storage requirements for bedding and household linens.

H.E., Ag. Eng. 326. Reg. S-8.

Ark. Asphaltic Stabilization for Sub-Floors. To (1) determine suitability of asphaltic concrete as floor base for tile or wood; and (2) establish recommended design procedures for use of asphaltic concrete as floor base for tile or wood if material is found to possess desired characteristics for such use.

Ag. Eng., H.E. 369. Reg. S-8.

Ark. Housing as it Affects Environmental Conditions for Poultry Production. (1) Learn feasibility of various degrees of environmental control in poultry housing under Arkansas weather conditions. (2) Establish recommended design procedures for various levels of poultry housing as might be found to be profitable & desirable through this study.

Ag. Eng., Poul. 414.

Ark. Meat and Egg Production of Chickens as Affected by Housing. To learn (1) effects of various quality levels of housing on poultry production, with broilers & layers (2) production performance of broilers & layers as affected by different housing levels.

A.I., Vet.S., Ag. Eng. 415.

Calif. Studies on the Energy Transformation in Organisms, Especially in Farm Animals. To study energy transformation in animals as (1) quantitative deficient food; (2) environmental conditions of body size; and (3) utilization of food energy.

A. I. 940

Calif. Environmental Influences on Orientation and House Design, Including the Use of Plant Materials and Home Furnishings to Improve Living Comfort. To determine how environmental conditions can be modified to improve living comfort of rural housing in the Western Region.

Home Ec., Hort., Ag. Eng. 1536. Reg. W-8.

Calif. Engineering Studies of Floriculture and Plant Nursery Practices.
Determine design data for greenhouse heating, cooling, humidity control & air purification. Develop methods & equipment for improvement of unit operations of floral, turf grass & plant nursery practices.
Ag. Eng., Orn. 1675.

Calif. The Improvement of Rural Housing in the Western Region. W-8
Regional Trust Fund. To serve as trustee and disbursing agent for the Regional Trust Fund allotted to the California Agricultural Experiment Station for the benefit of research under the Regional Project.
H.E. Reg. W-8.

Colo. Investigations in Wood Utilization, Preservation, Seasoning, and Technology to Induce More Efficient Use of Colorado's Native Woods.
To (1) determine utility & durability of local woods for fence posts, structural timbers, boxes & crates, etc., (2) determine inherent wood characteristics & problems associated with use of native woods which have not been adequately tested, (3) compare effectiveness of different preservatives & treatments designed to prolong service life of native woods used for farm, structural, & other purposes, & to develop new preservatives & treatments where existing ones are unsatisfactory, (4) develop economical seasoning practices for native woods to improve their use, (5) develop improved dimensional sawing techniques, (6) develop new products from & uses for native woods, including woody plants which are undesirable on rangelands & potential farmlands, & (7) develop new uses, such as mulch, bedding material, stock feed, alcohols, sugars, resins, etc., for by-products of wood utilization industry of value to ranchers, farmers, gardeners, & industrial concerns.
For. 70. Coop. F.S.

Colo. The Improvement of Rural Housing in Colorado: A Study to Determine Functional Requirements. To (1) collect, analyze, & apply basic information on rural families & their environmental conditions that is required in developing house plans suited to various areas of Western states; (2) establish basic planning data - space, equipment, & utilities - for dressing areas & related storage spaces in rural homes of West; & (3) develop & appraise house plans for selected sets of conditions that use to fullest extent the above information to make plans available for public use and carry on further research.
Home Ec., Eng. 206. Coop. BHNHE. Reg. W-8.

Conn.
Storrs The Relationship of Ventilation and Temperature in Commercial Broiler Houses to Respiratory Diseases. To (1) determine relation of environmental brooder and room temperature ranges to incidence and severity of respiratory diseases in broilers; (2) determine effect of air movement on severity of respiratory diseases; and (3) devise heating and ventilating systems to minimize or eliminate these environmental conditions as disease stress factors.
Ag. Eng., An. Dis., P.H. 204. Coop. BPISAE. Reg. NE-8.

Del. Environmental Conditions in Broiler Houses. To (1) determine effect of environmental conditions in commercial broiler houses upon rate of growth, production efficiency, maintenance of health, & market quality of broiler flocks; & (2) study environmental conditions produced artificially in broiler houses to determine effects of temperature & humidity variation in combination with insulation upon rate of growth, production efficiency, maintenance of health & market quality of broiler flocks.

A.P.I., Ag. Eng. 438-538. Reg. NE-8.

Ga. A Study of Dairy Products Processing Plants Equipment and Facilities. To (1) study present facilities of dairy processing plants in Southeast & determine methods to improve facilities; (2) develop standards of design, construction & operation of plants & equipment for dairy products processing that are economically adapted to an expanded dairy industry; & (3) study use of specialized equipment to increase dairy plant operational efficiency.

Ag. Eng., Dairy 38.

Ga. Poultry Processing Plants, Equipment, and Facilities. To (1) determine comparative efficiency of selected poultry plants varying in size and sequence of operations; (2) develop plant layout principles and improved materials, handling and work methods; and (3) design processing plants with equipment and facilities for conducting all operations incident to receiving processing and final disposition of finished product and supplies.

Ag. Eng., P.H. 61. Coop. AMS.

Ga. Requirements and Designs for Laundry Area for Southern Rural Homes. To (1) determine space needs for laundry activities in Southern rural homes; (2) determine practical, economical and efficient arrangements of equipment and facilities for laundry areas; (3) study selected practices which may contributed to effective use of laundry areas; and (4) design and develop plans for minimum and desirable laundry areas in relation to other work areas in Southern rural homes.

Home Ec., Ag. Eng. 75 (1 & 3). Reg. S-8.

Ga. Design and Construction of Work and Storage Spaces for Farm Homes. To (1) establish construction designs for built-in & prefabricated equipment based on needs for more efficient use of space, to aid in smoother functioning of household activities & greater enjoyment in family living; (2) develop simple, economical construction designs for appropriate materials & methods to meet service needs for various facilities; (3) construct & evaluate operational characters of facilities as to serviceability, ease of maintenance, adequacy of space, & appropriateness of design; & (4) apply findings in improvement of construction methods & designs.

Home Ec. 75-2. Coop. ARS. Reg. S-8.

Hawaii

A Study of the Performance of Mature New Hampshire Pullets Houses in Laying Pens of Various Construction. To (1) obtain data on different types of poultry housed to find which is best suited for production of eggs from layers fed high concentrations of cane final molasses; (2) modify and design laying pens and cages to correct conditions so that smaller percent of soiled eggs will be produced by each type pen; and (3) compare performance of layers on either litter or wire floors that are fed experimental molasses-type rations.

P.H. 418.4.

Idaho

Improvements in Utility, Cost, and Functional and Structural Design on Farm Buildings. To improve functional design of farm buildings with respect to insulation, heating, ventilation and humidity control, determination of space requirements, and determination of proper amount, concentration, and quality of light; and to improve structural design of farm buildings without increasing cost including development of a mortar, or other methods of joining pumice block, improvement in present methods of joining structural members, development of increased strength of structural members and reduction in their size and weight, determination of limitations and most advantageous uses of prefabricated aluminum and magnesium materials, and investigations of possibilities for improvement in truss design and construction.

Ag. Eng. 168.

Ill.

Effect of Environment on the Vitamin Requirements of Swine and Poultry. To determine (1) extent environmental temperature and humidity modify requirements of the pig and chicken for vitamins, particularly B-complex; and (2) metabolism of the vitamins under hot and cool conditions.

An. Sci. 05-426.

Ill.

Removing and Metering Small Grains and Supplements From Bulk Farm Storage. To develop methods and design equipment for removing small grains and supplements from bulk storage at variable but controlled rates for combining in feeds.

Ag. Eng. 10-351. Coop. USDA.

Ill.

Improvement of Production Efficiency in Farm Buildings. To (1) make time and travel studies of operations in dairy, beef, hog, and poultry buildings, interpret them in terms of flow charts, time and distance elements for tasks, and compare effects of building layouts and operations systems; (2) integrate into building plans such devices and mechanical equipment for labor-saving as are designed, developed or adapted in related research projects; (3) prepare building plans using methods and arrangements found to be effective for reducing labor and time requirements; (4) conduct detailed case studies on selected farms to determine (a) effect of making recommended changes, (b) relative importance of alternate systems of operation in relation to labor requirements, and (c) value of specific practices; and (5) contribute engineering techniques, analyses and design to cooperative studies on physical and management factors in dairying, design of barns, etc., and structural requirements for production buildings.

Ag. Eng., H.E., Ag. Ec. 10-374. Coop. EPISAE.

- III. Studies to Determine, Interpret and Present Farmhouse Requirements. To (1) determine requirements of farmhouses in terms of space, arrangement, environment, design of equipment, & functional features to provide satisfactory accommodations, (2) establish precise needs for space for household activities, storage, & arrangement of equipment & furnishings, & test effect of these phases of design on the worker in terms of time, motion, fatigue, & other measurable factors, & (3) interpret & apply results of field studies, case studies, lab research, & technological developments for developing plans & planning aids to new house construction & remodeling of old houses.
H.E., Eng. 10-377. Reg. NC-9. Coop. USDA.
- III. Housing and Environmental Requirements for Young Pigs. (1) Learn environmental requirements of temperature, relative humidity, air movement & sanitation for pigs from farrowing to weaning with reference to early-weaned pigs, cold-weather farrowing. Apply findings to structural designs, plans, & specifications for swine housing structures
Ent., Agron. 10-375. Reg. NC-23.
- III. The Preservative Treatment of Wood Products for Farm and Home Use. E. Horizontal Vs. Vertical Treatment of Fence Posts. To determine difference in depth of penetration and concentration of pentachlorophenol in posts cold-soaked in a horizontal and vertical position.
For. 55-331 E.
- III. Analyzing the Penetration of Pentachlorophenol Wood-Preserving Solutions. To develop a satisfactory qualitative method to determine presence of pentachlorophenol in wood.
For. 55-331 N.
- III. The Preservative Treatment of Wood Products for Farm and Home Use. O. A Study of Pressure-Treated Millwork. To determine the effects of a pentachlorophenol water-repellent pressure treatment on millwork under service conditions.
For. 55-331 O.
- III. The Effect of Low-Solution Temperatures, Wood-Moisture Content, and Intermittent and Continuous Types of Soaking on the Treatment of Ponderosa Pine. To determine what effect solution temperatures below 80°F., wood-moisture contents below fiber saturation point, & intermittent and continuous soaking periods have on the treatment of ponderosa pine with light-oil & heavy-oil solutions of pentachlorophenol.
For. 55-331 Sup. 1.

- III. Farm Construction as a Market for Native Timber. To learn (1) methods & channels currently used in marketing native timber for farm construction, (2) specifications & requirements for such timber, (3) extent to which native lumber can be used for farm construction in place of western & southern softwood lumber, (4) prejudices and objections to use of native lumber for farm construction, & how to remedy such, (5) possibilities of using recent technological developments as a means of developing new markets or improving existing ones for native lumber for farm construction.
Ag. Ec., Eng., For. 55-352. Reg. NCM-17.
- Ind. Thermal and Moisture Properties of Floors in Farm Buildings. To determine what types of floors are most suitable for farm buildings used for the storage of farm products and housing of livestock. To study heat and moisture transfer through floors taking into consideration such factors as the type of fill, soil conditions, flooring material and foundation.
Ag. Eng. 390.
- Ind. Improvement of Wood Utilization in the Structural Design of Buildings. (1) Design & test new structural elements of nail-glued, bolt-glued, & laminated construction for roof, floor, & wall systems. (2) Compare wood structures fastened by various means subject to both static & repeated loads. (3) Extend development of nail-glued connection completed & study economic aspects of different means of fabrication.
For., Ag. Eng. 672.
- Ind. The Effect of Cooling on the Growth of Swine. To determine effectiveness of (1) various types of artificial shade; (2) refrigerated slab; (3) refrigerated drinking water; and (4) water application to surface of swine.
A.H., Mech., Eng., Vet. Sci. 727.
- Ind. New Methods for Predicting the Strength of Structural Wooden Members. To (1) learn variability of structural wood elements of small size by introducing new methods of instrumentation & more rigorous methods of analysis; (2) examine behavior of full-size hardwood or softwood beams within present stress grades; & (3) devise non-destructive test system which includes variables other than those evaluated in a visual inspection system.
For. 746.
- Ind. Adaptation of Nail-Glued and Bolt-Glued Connections to Farm Buildings. (1) Apply known characteristics of nail-glued & bolt-glued structural elements to improvement of farm buildings by: a. investigating strength & behavior of full-size trusses with spans up to 60'. b. investigating problems in actual construction with such trusses, (2) test full scale rigid frames for building designs, (3) investigate durability of glued structures in farm buildings, (4) learn economics of using nail-& bolt-glued connections in farm buildings, & (5) learn design procedures for nail-& bolt-glued trusses.
Ag. Eng. 806. Reg. NC-23.

Ind. The Adaptability of Properly Cured Low-Grade Hardwoods for Structural Fabrication. (1) Evaluate performance of properly prepared problem species lumber with respect to workability using modern fasteners & devices for their application. (2) Test efficiency made with same using conventional loading systems with new systems made possible by new hydraulic test facilities under construction at Purdue. (3) Evaluate properly prepared lumber for component use in structural elements now under study on other Purdue projects.
Ag. Eng., For. 826.

Ind. Causes and Prevention of Incompatibility in Refrigerated Storage in the Marketing of Agricultural Commodities. To (1) determine chemical nature of volatile substances responsible for odor & flavor contamination in storage, (2) study possible methods of detecting odors & measuring odor levels, (3) develop suitable chemical or physical absorbents, absorbents or destroyers of odors in food storage rooms, (4) develop methods to prevent absorption of odors by food containers, storage room construction materials & refrigerating equipment, & (5) determine compatibility of commodities formerly not stored under refrigeration, & other products whose storage requirements have not been definitely determined.
Hort., Chem. (454): ES 54. RM:c-703.

Iowa Economic and Social Factors Related to Characteristics of Farm Dwellings in the North Central Region. To determine degree & nature of relationships between each of several socio-economic factors and: a. each of several physical characteristics of farm dwellings; b. composite of several physical characteristics of farm dwellings; and c. changes between 1940-1950 in prevalence of selected physical characteristics of farm dwellings, each for the region as a whole and for areas relatively homogeneous in point being studied.
Ec. Soc. 933. Reg. NC-9.

Iowa The Selection and Utilization of Building Materials. To (1) determine design conditions for relatively low pitched gable roofs for farm buildings; (2) determine optimum spacing of roof trusses, considering efficiency in use of materials & labor consumed in construction; (3) investigate various types of trussed roof framing, their relation to stresses in members, ease of fabrication, & assurance of satisfactory results; (4) investigate relative practicability & economy of using nails, bolts, connectors & glue in roof trusses; (5) determine magnitude of secondary stresses resulting from use of rigid glued joints & relation to design; & (6) design standard trusses to be included in Midwest Plan Service.
Ag. Eng. 1036. Reg. NC-23.

Iowa Farm Storage and Conditioning of Grains. (1) Learn if mechanical ventilation will control moisture migration & insect infestation in farm stored grains, minimum bin size in which mechanical ventilation is beneficial, & which methods & equipment for mechanical ventilation will produce desired results most effectively. (2) Learn pressures exerted by bin walls, floors, structural members & parts (as ducts), by stored grain. (3) Learn if heated or unheated air is more effective in drying grains. Study includes design of drying compartments & duct systems in bins, distribution of air in drying grain, selection of grain quality to drying process, & relation of cost to process & equipment. (4) Coordinate drying equipment & drying methods with production, harvesting, & handling equipment & methods. Objective related to project 1295.

Ag. Eng., Agron. 1296.

Iowa Planning and Coordination of Research Under Regional Project, NC-9, Farmhouse Requirements. To (1) serve regional project by acting as trustee & disbursing agent for 9b3 funds allotted to Iowa Station for regional travel & coordination amounting for fiscal year 1956 to \$ 1500.

Ag. Eng. Reg. NC-9.

Kans. Farm Family Living Patterns, Activities and Preferences Used as a Basis for Functional Designing of Farm Houses. Housing Requirements of Kansas Farm Families with Children. To (1) secure information on patterns of family living as shown by activities of family members; (2) study variation in family activities and requirements as affected by stage in family life cycle, and to a certain extent by type of farming and income; (3) determine family preferences for location of activities; (4) determine equipment and materials necessary to perform the activities; and (5) study space needed for performing the activities, and storing the quipment used.

H.E. 288. Reg. NC-9.

Kans. Concrete in Silo Construction. To (1) improve the quality of concrete used in silo construction; (2) study protection of concrete against silage action; and (3) develop better methods for repair of old concrete silos.

Ag. Eng. 359. Reg. NC-23.

Kans. Handling and Storage of Hay Crop Silage. To determine (1) most satisfactory methods of placing, leveling, and packing hay crop silage in trench and above ground silos; (2) effect of methods of packing, density, and different types of covering on spoilage in trench and above ground silos; and (3) design trench and above ground silos to reduce labor in filling and to be adapted to practice of self-feeding and mechanical unloading.

Ag. Eng. 374. Reg. NC-23.

- Ky. A Study of the Simplification of Farm Labor Practices, Equipment Usage and Design, and Building Location and Arrangement in the Producing, Storing, Curing, and Handling of Farm Products and Equipment. To make motion and time studies of laborers, products, equipment, and storage and curing facilities, on individual farms and Experiment Station Farm to ascertain effective farm practices, equipment usage and design, building location and arrangement, curing and storing practices in producing and handling farm products.
Farm Ec. 20.
- La. Building Materials from Farm Residues. To develop (1) new building materials from farm waste, (2) materials as resistant as possible to rot termites, rodents, and weather, and (3) a light weight panel for construction of farm homes and storage structures.
Ag. Eng. 555.
- Maine Poultry Laying House Environment. To evaluate gravity & mechanical ventilation methods & equipment for providing & controlling the environmental requirements for high egg production, feed efficiency, egg size, egg cleanliness, disease incidence, comfort & mortality of laying hens.
P.H., Chem., Ag. Eng. 68. Coop. USDA. Reg. NE-8.
- Md. Production, Harvesting, Curing and Storing of Maryland Tobacco.
D. Tobacco Housing. To determine optimum conditions of temperature, humidity and air movement for the curing and storing of tobacco, to determine the extent to which it is economically justifiable to achieve these conditions and to design and develop equipment and methods to maintain these conditions as uniformly as possible in all parts of full-size barns.
Ag. Eng. R-11-D.
- Md. Production, Harvesting, Curing and Storing of Maryland Tobacco.
E. Structures and Equipment for Tobacco Stripping. To determine the best design of stripping room as affected by size, arrangement and natural and artificial lighting; to determine optimum conditions for keeping tobacco in desirable condition and to design and test equipment for this purpose; and to develop new and improved equipment for stripping operations.
Ag. Eng., Agron. R-11-E.
- Mass. Thermal Destruction of Bacterial Spores and Heat Labile Vitamins in the Temperature Range of 250°- 300° F. To study destruction rates, & factors which influence destruction, of bacterial spores, & heat labile vitamins at temperatures of 250° - 300°F.
Ag. Eng., Food Tech. 320.

Mass. Comparative Statistical Study of Certain Methods for Bacteriological Testing of Water. To make statistically controlled study for comparison of the "Standard Methods" Most Probable Number procedure for estimating the coliform density of water with enumeration by the Millipore Filter technique & by Violet Red Bile & Desoxycholate Agar.
Eng. 331.

Mass. The Investigation of Low Cost Unit Housing for Poultry. To investigate (1) range and interrelationship of environmental conditions provided in low-cost, high-strength, unit house; & (2) structural design requirements which will assure low-cost, high-strength construction.
Ag. Eng., Poul., Vet. Sci. 1005. Reg. NE-8.

Mass. Refrigerated Fruit Storage. To study operation of refrigerated and modified atmosphere apple and cranberry storages in Massachusetts so that design conditions based on fundamentals can be established for these types of refrigerated fruit storages in Massachusetts.
Ag. Eng. 1012.

Mich. Materials and Fasteners Used in Fabricating Wood Trusses. To investigate (1) materials available for use in gusset plates for trusses with glue as a binder; (2) procedures and equipment for measuring strain in wood; and (3) use of models in analyzing strain in trusses.
Ag. Eng. 455. Reg. NC-23.

7 Mich. The Effect of High Voltage Cathode Ray Ionizing Radiation on Certain Microorganisms, Molds, and Insects and on the Food Products in Which they Are Found. To (1) learn dosage of accelerated electrons needed to destroy grain & grain products infesting insects, their larvae, & eggs; (2) learn optimum effective depth of penetration of accelerated electrons into various products; (3) learn rate at which products can be irradiated; (4) learn cost of irradiating various products; (5) learn effect of ionizing radiations on palatability of whole wheat flour made from treated grain; (6) learn effect of ionizing radiations on enriched flour, on nutritive value of flour & palatability of bread made from flour; (7) study effects of storage after treatments on whole wheat & white flour; (8) learn if cathode ray treatment of wrapped & unwrapped & frozen & unfrozen meat will reduce or control undesirable color changes & quality deterioration; (9) learn effect of cathode ray treatment on palatability & nutritive value of meats; (10) determine minimum dosage of cathode rays needed to kill bacteria in milk; & (11) determine effects of cathode ray treatment of milk enough to kill bacteria on palatability & nutritive value of products.
Chem. Eng., Ent., Pl. P., D.H., A.H., H.E., Bact. 807.

Minn. A Study of the Properties of High Moisture Ensilage That Influence the Design of Silos and a Study of Methods for Reducing Moisture Content of Ensilage Crops by Mechanically Expressing the Moisture from the Green Material. To determine the quantity of moisture drainage from silos, its rate of flow & its chemical composition.

Ag. Eng. 1203.

Minn. A Study of Factors Influencing the Keeping Quality and Processing Value of Grain. 1. Biochemical and Microbiological Factors Involved in the Respiration, Storage Behavior and Industrial Value of Grains and Their Mill Products. 2. Effects of Methods of Drying Grain on its Processing Value. To (1) determine significance of moisture, temperature, microflora, etc. on industrial value, respiration, heating and spoilage of grains and their mill products; (2) investigate underlying factors in deterioration of grain and its products in storage; (3) study methods to minimize deterioration in storage; & (4) establish conditions under which grains may be artificially dried with minimum deleterious influence on viability & processing values.

Ag. Biochem. 1504.

Minn. Storage of Grain in Various Atmospheres in Sealed Bins. To learn effects of various atmospheres on the microbiological, entomological, & biochemical factors that influence the quality of stored grains, especially wheat, corn & soybeans.

Ag. Biochem. 1517.

Minn. A Study of Farm Fencing Materials, Methods and Costs. 1. The Production, Marketing and Utilization of Treated Posts from Minnesota Species. 2. Improving and Reducing the Cost of Fencing Materials and Methods. 3. Service Tests and Demonstration Fences. To (1) determine more accurately the cost of various types of farm fencing, (2) improve and reduce cost of farm fencing by studying various fencing methods and materials and (3) investigate production of fence posts and possibility of developing new small industries in northern Minnesota that would harvest, process, and market treated posts which would give the farmer long service life.

For., Ag. Eng., 1912. Coop. For. Serv.

Minn. Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage. III. Lumber and Other Wood Products. To determine prevalence and cause of discoloration of aspen wood, and to devise methods of prevention and control.

Pl. Path., Bot. 2220-3.

Miss. A Study of Different Masonry Building Materials and Methods of Erection for Outside Wall Construction and their Effects on the Inside Temperature and Heat Loss in Farm Homes. To (1) compare temperature or comfort inside houses made of different types masonry outside walls, using house with wood frame construction for comparison; (2) compare heat loss thru different masonry walls & compare them with wood frame house; (3) study how heat absorbed in masonry walls during daytime will affect comfort inside the building during night in hot season; (4) test different masonry units, combinations of units, or different methods of erection for an economical, durable & long-life construction; & (5) test to see if masonry walls on sunny side of house during winter will absorb heat from sun rays & help warm the building.
Ag. Eng. FB-1, Reg. S-8.

Miss. Adapting, Construction, and Air Conditioning of Poultry Houses for the Most Economical Production. To (1) find optimum air conditioning requirement for maximum broiler and egg production at minimum cost; (2) study and evaluate different methods of ventilating poultry houses to control temperature, humidity, and air movement; (3) construct and equip economic house or houses adapted to air conditioning and find effect on broiler growth and egg production. Study methods of heating or supplementary heating of poultry houses by use of solar heat.
Ag. Eng., P.H. FB-6.

Miss. Control of Insect Pests of Stored Corn and Small Grain. To determine (1) necessary modifications of steel and other type bins used in Mississippi for the efficient use of fumigants; (2) rates and frequency of application of fumigants needed in properly prepared bins necessary to avoid being graded as 'weevily'; (3) efficiency of 'grain protectants' for the control of different species of insects on clean grain; (4) effect of foreign matter and moisture content of grain (surface and beneath surface) on the control obtained from use of 'grain protectants' and fumigants; (5) importance of field infestations and possibly of farm management being used to reduce the infestations; (6) value of chemicals other than those tested which have characteristics that suggest a possible means of control of the rice weevil on corn stored in the shuck; and (7) differences in the rate of increase of rice weevil populations in those corn single crosses which have possibilities of being used for the production of hybrid seed.
Zool. & Ent. PH 3.

Mo. Marketing the Timber Crop. a. Preservation of Posts and Farm Timber. To secure factual data on simple methods of preservation employing methods available to the farmer; this year in particular to bring analysis of data up to date and to prepare a manuscript for publication, as well as to put in additional posts to service tests.
For. 120-9.

- Mo. Environmental Requirements for Farm Animal Shelters. a. Measurements of Dairy Barn Heat and Moisture Production. To measure moisture production in a typical stall type dairy barn, and to estimate or determine that portion vaporized from the barn and litter surfaces and that portion produced directly from the cows.
Ag. Eng., D.H. 136-a. Coop. USDA. Reg. NC-23.
- Mo. Environmental Requirements for Farm Animal Shelters. b. Determination of Operational Limits for Use of Open Housing for Young Calves. To determine effective environment within a selected open type young calf structure and determine any correlations between environment and calf growth and incidence of disease.
Ag. Eng., D.H. 136-b. Coop. USDA. Reg. NC-23.
- Mo. Environmental Requirements for Farm Animal Shelters. c. The Design and Development of a Portable Scale for Field Measurements of Insensible Weight-Loss of Cattle. To design and develop a portable scale for measuring the insensible weight-loss of animals.
Ag. Eng., D.H. 136-c. Coop. USDA. Reg. NC-23.
- Mo. Environmental Requirements for Farm Animal Shelters. d. Design and Development of a Partitional Calorimeter for Cattle. To use all available engineering and physical data to develop a design for a partitional calorimeter capable of containing one large animal such as a dairy cow.
Ag. Eng., D.H. 136-d. Coop. USDA. Reg. NC -23.
- Mo. Environmental Requirements for Farm Animal Shelters. e. Effect of Cyclic Changes in Temperature and Radiation on Skin and Hair Temperatures of Cattle. To measure skin and hair temperatures of cattle subjected to cyclic changes in air temperature and radiation in the Climatic Laboratory, and to use the results for prediction of animal behavior under similar outdoor conditions.
Ag. Eng., D.H. 136-e. Coop. USDA. Reg. NC-23.
- Mo. Forage Harvesting, Handling, Storage and Feeding. a. Design of Grass Silage Structures for Efficient and Economical Storage and Feeding. To determine the magnitude of lateral stress of silage when packed in above-ground horizontal silos, and with this information design various types of retaining walls for the construction of such above-ground silos.
Ag. Eng. 138-a.
- Mo. Farm Home Utilities. A. Farm Water Supply. To (1) design and test effectiveness of at least two different experimental vertical slow-sand filters under different pond water conditions; and (2) develop a practical technique for filtering pond water and set forth specifications for such a filtering system, which can consistently be expected to supply water suitable for domestic purposes in farm homes.
Ag. Eng. 155-A. Reg. NC-9.

Mo. Utilization of Native Timber and Residues. To (1) survey wood-using industries in state to learn kind of wood technology problems, (2) study conditioning or treatment of wood by physical or chemical means to improve its value as raw material, (3) study improvement of techniques for fabricating products from wood, (4) develop uses for low-grade wood or wood residues, (5) study physical & structural properties of wood.

Eng., For. 159.

Mo. Marketing and Processing of Hardwood Panelling. To determine (1) consumer preference for different grades, sizes, & finishes of panels, (2) effects of different finishing materials & methods of applying these materials on appearance of panels, (3) effectiveness of different types of fasteners for holding panels in place, (4) best methods of manufacturing panelling, & (5) cost of producing panelling.

For. 259. Reg. NCM-17.

Mont. The Arrangement of and the Space Required for the Efficient Storage of Home Sewing Equipment. To determine (1) number of groups for which sewing storage plans need to be developed, (2) description of each group, and (3) sewing equipment needed by each, and (4) determine space requirements for these arrangements, and prepare sewing center floor plans in number & variety needed in planning Western homes, & (5) develop as sewing centers for the home efficient arrangements of equipment needed for (a) repair & renovation of family clothing, & (b) clothing construction.

Home Ec. 31. Coop. BHNHE. Reg. W-8.

Nebr. The Improvement of Existing Farm Dwellings in Terms of Basic Space Needs. To (1) determine condition of existing farm dwellings in terms of space, room arrangement, window and door placement, utilities, and storage, so that basic remodeling plans may be recommended in terms of basic space needs for minimum health standards, most efficient use of space, best possible placement of doors and windows, best possible placement in existing dwellings of utilities & equipment such as running water, adequate wiring and heating, and best kind and place of storage facilities in existing farm dwellings; and (2) cooperate with North Central Regional Study to determine and interpret farmhouse requirements based upon patterns of farm family living.

Home Ec., Ag. Eng. 340-A. Reg. NC-9.

Nebr. Potato Storage in Nebraska. To determine how to construct and operate potato storages in various parts of Nebraska to preserve different varieties of potatoes for specific uses in best condition or for maximum periods of time in the most economical manner. More specifically, to (1) evaluate storage characteristics of various units of the new storage at Scotts Bluff Experiment Station when operated according to best known procedures as determined by effect on the potatoes - or to acquire an inventory of physical condition brought about within the various units of storage, and in the adjacent ground, and their influence on the tubers, so as to provide comprehensive information on type of conditions the storage can provide for later experiments; (2) determine how more effective potato storage can be provided economically by modifying design or operational practices of storages; (3) determine effect of various preharvest, harvest time and storage conditions upon physiology of tubers of different varieties being stored for specific purposes; and (4) ascertain physical conditions provided by various types of storages located in various parts of the state where climatic and ground conditions differ.

Hort. 439.

Nebr. Sidewall Buckling of Tractor Tires. (1) Develop techniques of detecting & methods of expressing tractor tire sidewall buckling. (2) Study effects of tractive force, vertical load, tire air pressure, tire temperature, speed & slippage on sidewall buckling of rear tractor tires. (3) Learn practical load limits below which tire buckling will not be serious.

Ag. Eng. 515.

N.H. Influence of Light and Humidity Upon the Physical Condition of Broilers. To determine (1) kind and amount of light which will provide optimum physical condition in broilers; (2) humidity range which will provide optimum physical condition in broilers; and (3) poultry house construction which will use to best advantage the findings obtained in preliminary work.

P.H. 36. Reg. NE-8.

N.J. Development of Structures and Allied Equipment for Processing, Storage, and Self-Feeding of Forage to Cattle. To (1) design and construct two self-feeder silos; and (2) modify or design certain machines to use in self-feeding silage and hay.

Ag. Eng. 52. Reg. NE-13.

N.J. A Study of Black Locust and Its Suitability for Fence Posts as Influenced by Spacing, Pruning and Cultural Operations. To establish the proper management procedures for black locust, and investigate its growth and yield, and study performance on land unsuited for farming.

For. 302.

N.J. Sweet Potato Storage Investigations. To determine effect of various temperatures and humidities during the curing period on the incidence of several diseases affecting sweet potato during storage period and to consider effect of environmental factors occurring during holding period on keeping qualities and of increasing CO_2 and O_2 concentrations in storage house air.

Pl. Path. 461.

NYC Studies to Determine Causes and Control Measures for Sub-Surface Black Spot of Potatoes. To determine causes of black spot and devise measures for its elimination or prevention.

Veg. Cr. 23. Coop. BPISAE.

NYC The Utilization of Small Trees from the Farm Woodlot and Farm Plantation. To find new uses and more fully explore existing uses for the products which can be made from small trees, in order that the whole farm enterprise may be benefited and the forest thinning operation conducted at a profit.

Ag. Eng. 40. Reg. W-24.

NYC Improved Housing Design Based on Family Living Characteristics. To (1) determine specific patterns of family living, including habits and motives underlying different family activities as they are related to housing design in contrast to housing "preferences", and (2) make information available in a form of maximum utility to rural and urban families, builders, planners, and others.

Housing Design 42.

NYC A Study of Methods and Equipment for the Storage and Handling of White Potatoes with Particular Emphasis on Preserving Quality. To study (1) influence of controlled ventilation on early harvested vs. late harvested potatoes; (2) influence of controlled ventilation on incidence of storage diseases; (3) influence of controlled ventilation on sprouting, shrinkage with and without sprout inhibitors; (4) performance of controlled ventilation systems such as air movement rates, static pressures, controls, power costs; etc.; and (5) develop efficient methods and equipment for handling potatoes into and out of storage.

Veg. Crops, Pl. Path., Ag. Eng. 53. Coop. BPISAE.

NYC A Study of the Problems of Precooling Apples Preparatory to Refrigerated Storage. To conduct lab studies using vacuum and cold water, on the rate of cooling of apples and to observe other physiological reactions of the fruit; and to devise and test practical means of rapid cooling on a commercial basis.

Ag. Eng. 71.

NYC

The Design of Farm Buildings and Accessory Equipment to Improve Efficiency, Flexibility and Serviceability and to Reduce Construction and Operating Costs. (1) Learn average stress grade of local timbers; evaluate end-restraint effect of timber connections & develop design procedures to use data; evaluate actual loads in farm buildings to compare with assumed loads used for design purposes; evaluate distribution of concentrated loads on floors; develop better methods for precutting & prefabricating farm buildings; test newly developed buttress design; test effectiveness of reinforcement in masonry walls; develop new methods of providing masonry walls; develop methods of providing masonry walls with additional stability. (2) Learn desired rate of cooling & drying for onions; learn most desirable way to cool; learn depth of storage to prevent pressure deformation as related to cooling; devise new methods & evaluate new ones for handling to reduce bruising, skinning, & other damage & improve labor efficiency; learn pressure exerted on storage walls.

Ag. Eng., Hort. 109.

N.C.

Utilization of Low Quality Wood Material. I. Problems of Hickory Utilization. To investigate and develop methods and processes for increasing or improving utilization of currently low value material. In the forest this refers to (1) inferior, little-used species, (2) deteriorated residual stands left after logging operations, (3) material removed in timber stand improvements, (4) timber on small tracts or small volumes of high grade material too far from mills, (5) timber isolated from markets for which it is best suited, and (6) valuable species of inferior quality growing on poor sites

For. M-7. Coop. US Forest Serv., BPISAE.

N.C.

Factors Influencing the Drying of Veneer. To investigate the effect upon drying rate of veneer of the following factors: veneer species, heart and sap condition, veneer thickness, initial moisture content, drying temperature, time of exposure, and moisture content of air during drying.

For. M-10.

N.C.

A Crop Drying and Curing Building for the Farm. To develop a building of general utility for all crops.

Ag. Eng. 11.

N.C.

The Life History and Control of Insects Affecting Stored Corn, with Particular Reference to the Rice Weevil and the Angoumois Grain Moth. To determine (1) most satisfactory fumigants or other insecticides to control rice weevil & angoumois grain moth, & best conditions under which these can be used; (2) effects of time of planting & harvesting on insects in stored corn; & effects of drying & different types of storage on development of pests in stored corn; & (3) rate of development of weevils & moths in stored corn that has been reported as showing some resistance to stored pest attack.

Ent., Agron. P59.

N.C.

The Effect of Management and Housing Upon Growth and Health of Dairy Calves. To study relative merits of various systems of housing and related management practices for raising young dairy calves, as judged by growth, efficiency of gain, and general health with due consideration to economical aspects.

D.H. 64.

N.Dak.

An Electrical Househeating System Vs. a Hot Air System Fired With Oil, Bottle Gas, or Natural Gas. To secure (1) operating & maintenance cost information on an electrical heating system as compared to hot air system fired with oil, bottle gas, or natural gas, (2) information on temperature variation, dust accumulation, & humidity on the two systems.

Ag. Eng. 30. Reg. NC-9.

Ohio

The Determination of Suitable Work Surface Materials and Finishes Used in Rural Homes from the Standpoint of Maintenance, Durability, and Cost. To (1) determine suitability of available materials and finishes for work counter surfaces which will give durability, satisfaction, and can be cared for easily; (2) ascertain comparative costs of these materials and finishes - initial, maintenance, and length of service; (3) ascertain relative costs of installation of these surfaces; and (4) ascertain availability of materials on the market.

H.E., Chem. & Ag. Eng., Archi. 35-2. Reg. NC-9.

Ohio

Production of Silages Under Controlled Conditions. To (1) explore relation of effects of kind & condition of crop & holding temperatures, dry-matter content, silage densities & gases in voids on resulting silages in containers of up to 2 cu. ft. capacity, kept under controlled constant or varied conditions of temperature, density, drymatter, & crop condition; (2) extend to containers of Pilot Silo size conditions above found most promising; & (3) make available for large scale tests whatever promise to have farm application.

Agron., Ag. Eng. 35-3.

Ohio

The Production, Processing, and Utilization of Native Timber for Farm Buildings. 1. A Study of the Possibilities of Utilizing Short Pieces of Rough Native Lumber in Trusses and/or Beams. To develop and test methods and procedures for using short pieces (1.5 - 10 ft. long) of native timber in trusses and/or beams.

Ag. Eng. 66. Reg. NC-23.

Okla

Storage Requirements for Oklahoma Wheat. To learn needed storage capacity & distribution of storage facilities to efficiently market wheat in Oklahoma.

Ag. Ec. ES 280. RM:c-703.

- Oreg. The Development of the OSC 141 Farm-Building Construction Incorporating Interchangeable Wood Parts with which Buildings Can Be Easily Assembled, Altered or Disassembled. Develop & evaluate for feasibility OSC 141 Farm-Building Construction incorporating interchangeable standardized wood parts with which buildings that are suitable for many farm buildings can be assembled, altered, or disassembled.
Ag. Eng. 273-1.
- Oreg. Planning & Coordination of Research Under Regional Project NC-23, Farm Structures and Equipment. (1) Serve regional project by acting as trustee & disbursing agent for 9b3 funds allotted to Iowa Station for regional travel & coordination amounting for fiscal year 1956 to \$2000.00.
Ag. Eng. Reg. NC-23.
- Pa. Methods of Preservation and the Measurement of the Nutritive Value of Forage Crops. C. The Losses of Nutritive Value of Grass Silage in Tower Silos as Affected by Method of Preservation. To determine losses from silo from seepage and from fermentation and evaluate effectiveness of use of sodium metabisulfite, wilting, and absorbers in reducing losses.
An. Nutr., D.H. 1016-C.
- Pa. Factors Involved in the Preparation for Freezing, Storing, and Preparation for Serving of Foods. To determine the influence on quality of certain technological factors encountered in the preparation, freezing and cooking of frozen foods, with particular reference to methods of preparation and handling previous to freezing, method and rate of freezing, time and temperature of storage, and methods of cooking and serving.
A.H., Hort., Ag. Eng., Chem., Bact., H.E. 1065.
- Pa. Environmental and Management Factors Affecting the Quality of Poultry Meat and Eggs. To determine (1) effect of the following upon temperature and relative humidity in poultry house: a. ventilation with pressure inlets as compared to exhaust fans and conventional slots and windows, b. forcing air into poultry house from north and south sides, and c. solar energy entering building thru insulated windows; (2) how condition of litter is affected by inside temperatures, and relative humidities as related to method of ventilation and solar energy; (3) effect of removals of droppings by various methods and at various intervals, upon condition of floor litter and inside temperature and humidity; (4) extent that floor space required by layers and broilers is affected by: a. method of ventilation, b. method and frequency of removal of droppings, and c. control of solar energy; and (5) effect of temperature and relative humidity in poultry house, methods of removal of droppings, and control of solar energy upon: a. cleanliness of egg produced, b. egg size and production by layers, c. market egg quality, d. rate of gain and market quality of carcass, and e. health of flock.
A.E., P.H. 1148A.

- R.I. The Planning and Coordination of Research Under Regional Project NE-8, Essentials of Poultry Housing for the Northeast. To further regional research on poultry housing by serving as trustee for Section 9b3 funds allotted for the planning and coordination of NE-8.
Ag. Eng. 83. Reg. NE-8.
- S. C. Design of Farm Machinery Storage Buildings for the Southeast Based on a Comprehensive Study of Requirements. To (1) determine farm machinery storage building requirements in Southeast for farms with 1, 2 or 3 tractors; and (2) prepare for distribution to farmers, plans of machinery storage buildings developed as a result of this study.
Ag. Eng. 20.
- S. Dak. Application of New Materials and Design in Farm Buildings. To (1) obtain service and design information on farm building materials on such buildings in use at South Dakota State College and its Field Stations and on successful farms, especially the following phases of construction materials; a. dairy barn floors - concrete, b. roofs - composition, wood, metal, and bituminous, c. foundations - concrete and concrete block, d. feeding floors - concrete, e. walls - wood and concrete block, f. granary - wood and steel (portable), g. silo construction - concrete and tile, h. hog houses - wood (portable), i. wood framing fasteners - metal, j. end grooved siding - wood, k. light weight rafters on long spans - wood and metal, and l. clay product walls - brick and tile; (2) utilize data secured toward better structural development, more satisfactory utilization, and increased serviceability of farm buildings and homes; and (3) assemble and evaluate surveyed data of existing and future structures and incorporate the results in form of farm building and farm home design.
Ag. Eng. 203. Reg. NC-4.
- S. Dak. Handling, Storage, and Feeding of Grass Silage with Comparisons of Labor Requirements, Costs, Feeding Values, and Losses in six Different Methods of Storage. A. Structural Requirements, and Performance of the Above-Ground Trench Silo, as Compared to Other Silo Types. To (1) construct above-ground trench silo with equipment & self-feeding & determine best methods & resulting costs; (2) develop methods of measuring silage volumes & densities for temporary silos & calculate silage losses from various methods; (3) determine comparative cost of filling various types of silos including methods of handling long grass silage; & (4) survey S.D. farming area for types of structures used for silage & the management problems unique to each one.
Ag. Eng. 237-A. Reg. NC-23.
- S. Dak. Portable Floor Plate Brooder with Electric Heating Elements. Develop portable brooder, with electric heating elements, low in cost, economical in power requirements, & one with under floor heating installations.
Ag. Eng., Poul. 280.

Tenn. Functional Requirements and Facilities for Southern Homes. To (1) obtain Project S-8, Subproject 1 and Family Food Consumption in the Southern Region in Certain Types of Farming Areas information on equipment furnishings, & practices pertaining to meal service commonly found in Southern rural home of the first three socio-economic levels; (2) determine space requirements for storage pertaining to meal service; & (3) determine convenient arrangement of meal service facilities.

H.E. 21. Coop. ARA, BHNHE & EPISAE. Reg. S-8.

Tenn. New Type Concrete Block for Building a Farm House. To (1) develop and test methods of construction using concrete units that have been developed and tested individually; (2) determine practical value of local expanded shale aggregate for construction of all-concrete farm houses; (3) find out if house can be constructed by unskilled or semi-skilled labor; (4) determine cost of type of construction; and (5) have an all-concrete house in which factors that affect comfortable living can be studied.

Ag. Eng. 60. Reg. S-8.

Tex. Storage of Cotton Seed for Planting Purposes. To (1) determine effectiveness of different methods of aeration with forced air in maintaining high germination & in preventing increase in fat acidity value of cotton planting seed stored in large tanks; & (2) study air distribution systems & equipment & determine their effectiveness in cooling cotton planting seed when stored in large quantities.

Ag. Eng. 665.

Tex. Desirability of Materials and Methods of Installation for Floor Coverings, Drainboard, Surfaces, Floor and Wall Finishes, and Wall Coverings. To (1) determine by lab tests & actual installation in farm homes the useful life of covering, surfacing & finishing materials for use in farm home construction; (2) determine proper application for covering, surfacing & finishing materials used in the homes to include bindings, fastenings, & adhesives; (3) determine relative desirability of various materials for specific applications; & (4) correlate useful life & cost with desirability of various covering, surfacing & finishing materials for various types of uses.

Ag. Eng. 943. Coop. ARS. Reg. S-8.

Utah Functional Requirements of Rural Housing. To (1) collect and analyze basic information on rural families and their environmental conditions, required in development of house plans for rural Utah, (2) develop basic planning data for specific household functions, and (3) develop and appraise house plans for selected sets of conditions, utilizing the above information to fullest possible extent.

H. E. 296. Reg. W-8.

- Vt. Possibilities for Improving Vermont Farm Houses. To investigate possibilities for altering houses occupied by owner-operators of Vermont dairy farms so as to make them suitable to the needs of present-day families. Possibilities will be according to: ability of farm to pay for adequate house, present value of farm and probable future income; present conditions of the house; alterations needed to make house satisfactory; and cost of needed alterations.
H.E., Ag. Ec. 14.
- Va. Farm Work Simplification. 1. Work Simplification in Apple Packing Shed Operations. To (1) apply techniques of motion & time study developed in industry to operations performed in apple packing sheds, (2) determine methods of working, arrangements of work places, & types of equipment that will reduce hours of labor required to operate apple packing sheds & to prepare detailed instructions needed by operators to carry out those plans, (3) determine principles of motion economy applying to apple packing shed operations & prepare illustrations of those principles, (4) determine those combinations of practices, facilities, & layout, under varying conditions of size, etc., which provide minimum costs at various levels of operation, (5) attain the following specific objectives: (a) eliminate unnecessary steps, (b) arrange necessary steps in best order, (c) maximize productivity of each step, (d) integrate necessary steps to maximize productivity of whole job, (e) determine time it takes to do the jobs, (f) develop standards of work performance & techniques for achieving these standards.
Ag. Ec. 8234-1.
- Va. Structural Stability of Farm Buildings Under Accelerated Cycles of Loading. To learn the structural stability of full scale building sections joints, & other components under accelerated cycles of loading; & develop criteria for balanced designs.
Ag. Eng. 8460.
- Wash. Housing Requirements of Rural Washington Families. To (1) develop techniques for determining space requirements for specific and combinations of activities in farm home workroom; (2) determine space requirements for such activities; and (3) design workrooms incorporating findings of the study.
H.E., Eng. 826. Reg. W-8.
- Wash. Farmstead and Farm Building Design and Arrangement for Dairy Farms in the Irrigated Section of Washington. To coordinate existing knowledge of dairy farm buildings design and arrangement and to synthesize new designs and integration of the farm home, barns, milk house, and other buildings into effective farmstead plans for living and dairy production and different stages of development for new, irrigated dairy farms.
Ag. Ec., Ag. Eng., H.E., D.H., P.H., R. Soc. 964. Coop. Ag. Ex., Bur. of Reclamation.

- Wash. The Effects of Artificial Light on Growth of Broilers. To determine effects of varying period of light on gain and feed efficiency of broilers.
Poul. Sci. 1204.
- W. Va. To Determine the Most Efficient and Economical Methods of Removing Manure and Litter from Dairy Barns. To evaluate techniques for manure and litter removal from dairy barns as to efficiency, effectiveness and adaptability to various types of barns. To explore possibilities for improvements in the following systems; (1) cross-barn mechanical cleaners, (2) continuous gutter cleaners, (3) liquification, digestion, tank disposal, and (4) other.
Ag. Eng., D. H. 6.
- W. Va. Poultry House Design for West Virginia. To determine building requirements for brooding and laying houses in West Virginia as indicated by air requirements for control of moisture, temperature and ammonia fumes in a tightly sealed building without windows.
Ag. Eng., P.H., A.H. 44. Reg. NE-8.
- Wis. A Study of Farm Labor in Wisconsin. To study (1) by field investigation, the family-farm labor force subject, bring it up to date, & check some inferences not clearly established; (2) migratory labor; & (3) include an analysis of local seasonal farm labor force, nature of its source, & its integration with the year-round labor force on Wisconsin farms.
Ag. Ec. 684. Coop. Ext.
- Wis. Design and Operation of Improved Crop Drying Structures. To investigate & develop procedures for conditioning & storing forage, small grain & corn crops with the least manual labor & at the same time produce excellent quality livestock feed at a minimum cost.
Ag. Eng. 915. Coop. ARS.
- Wis. Environmental Characteristics of a Solar Farrowing House and Their Effects on the Growth of Small Pigs. Learn environmental characteristics of 3 sections of farrowing house as: conditions existing in conventional house, same & heat lamps, same as 1st & heated floors. Study effect of each arrangement on health, growth rate of pigs from farrowing to short time after weaning.
Ag. Eng., A.H. 948. Reg. NC-23.

Regional Projects

NC-9

The Determination and Interpretation of Farmhouse Requirements Based Upon Patterns of Farm Family Living, and the Development of Plans, Construction Practices, and Effective Methods for Attaining Adequate Economic Housing for Farm Families. 1. To establish farmhouse requirements of space, arrangement, utilities, equipment, surface materials and finishes, and other facilities needed by farm families for safety, health, comfort, convenience, and economy. 2. To study the influence of selected geographical, economic and social factors upon housing needs of farm families as a basis for adapting house plans and remodeling procedures to serve the interests of various groups. 3. To develop basic plans for new farmhouses and to determine fundamental procedures for farmhouse remodeling that have qualities of adaptability and flexibility to meet various needs.

Cooperating stations and agencies: Federal-grant projects - Ill., Iowa, Kans., Mo., Nebr., N. Dak., Ohio; and USDA.

NC-23

Requirements and Design of Structures and Related Equipment for Unified Farmstead Operations. (1) To establish and conduct investigations in the area of Farm Buildings and related equipment sufficient in scope that the various phases of structural design, production requirements, environment, materials handling, labor efficiency, and mechanisms may be studied in detail and coordinated into recommendations for efficient farmstead operations. (2) To define the areas of research needed for planning of unified operations within the farmstead as follows: a. control of environment within structures; b. efficient labor, management, and mechanization for handling, processing, and storing livestock feed, forage, and bedding, and removing manure; c. Efficient labor management and mechanization for animal production and handling, storing, processing, and controlling quality in harvested food crops, and animal products; d. Performance and requirements of structural materials and their application to design in the development of buildings and related equipment. (3) To initiate specific sub-projects insofar as resources permit, that will outline work planned for the areas of research described under objective 2.

Cooperating stations and agencies: Federal-grant projects - Ill., Ind., Iowa, Kans., Mich., Mo., Ohio, Oreg., S. Dak., Wis.; and USDA.

NCM-17

The Marketing of Farm Woodland Products in the North Central Region. The purpose of this project is to discover new or more profitable markets and uses for all the material now being produced in farm woodlands as a means of increasing farm income and encouraging better woodland management and utilization. The specific objectives will be to determine the potentialities of several market outlets as follows: 1. The marketing and processing of hardwood paneling. 2. Farm construction as a market for native timber. 3. Marketing practices and price formation in North Central farm woodland forest products sales. 4. The market for farm-produced wood chips for livestock bedding.

Cooperating stations: Federal-grant projects - Ill., Mo.

- NE-8 Essentials of Poultry Housing for the Northeast. 1. To determine the optimum range and interrelationships of the environmental requirements of chickens for meat and egg production and maintenance of health. 2. To evaluate materials, equipment and methods for providing and controlling the environmental conditions in poultry houses.
Cooperating stations and agencies: Federal-grant projects - Conn., Del., Me., Mass., N.H., R.I., Wash., W. Va.; and BPISAE, USDA.
- NE-13 The Mechanization of Forage Crop Harvesting, Processing, Storing, and Feeding. To determine the job and mechanical requirements and develop methods and equipment for the production of quality forage with special reference to the operations of: (1) Harvesting, (2) Processing, (3) Storage, and (4) Feeding.
Cooperating station: Federal-grant projects - N.J.
- S-8 Functional Requirements and Plans for Southern Rural Homes. 1. To complete publication obligations of current sub-projects. 2. To develop minimum and desirable recommendations for family activity centers, efficient arrangements of equipment and activity centers, functional requirements and designs for household facilities and equipment; and to test the multiple use of rooms and areas and to determine the need for, and means of accomplishing flexibility in space arrangements and sizes. 3. To determine more efficient utilization of native and other materials and to develop appropriate structural methods for low-cost maintenance and construction of new farm homes and remodeling of existing farm homes. 4. To develop new designs and a series of remodeling designs to conform to the requirements and findings established by previous studies and by objectives 2 and 3.
Cooperating stations and agencies: Federal-grant projects - Ala., Ark., Ga., Miss., Tenn., Tex.; and ARS, ARA, BHNHE, BPISAE.
- W-8 The Improvement of Rural Housing in the Western Region. 1. To continue studies to determine the dimensions of space needed (a) to carry on household activities, (b) to store family possessions conveniently, and (c) to arrange equipment efficiently, for each of the various parts of a farm house. 2. To continue the work of developing a set of recommendations for the design of certain features of farmhouses, based on an examination of available environmental data for this region and knowledge of human needs for comfort and health. 3. To use the basic planning data developed under objectives 1 and 2 in compiling lists of unit space requirements and desirable features for homes, and in the preparation and evaluation of farmhouse plans.
Cooperating stations and agencies: Federal-grant projects - Cal., Colo., Mont., Utah; and BHNHE.

W-24

Improvement of Mechanized Production and Harvesting of Irrigated Cotton in the Arid and Semiarid West. (1) To develop or modify methods and equipment for planting, cultivating, and application of agricultural chemicals for cotton in irrigated soils. (2) To determine the effect on mechanical harvesting efficiency of machine adjustments, harvesting procedures, defoliation, and other cultural practices. (3) To determine the desirable cotton characteristics for mechanical operations.

Cooperating station: Federal-grant projects - N.Y. (Cornell)

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BEEF CATTLE

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on Federal-grant research being conducted at the State agricultural experiment stations.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. Each project is identified according to the department conducting the research, the station number, the number of the regional project (if several States are working cooperatively), and any Service of the U. S. Department of Agriculture which may be cooperating in the study. The identification of the project as given at the end of the descriptive material may be illustrated thus - An. Ind. 26 (W-1), Coop. ARS.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern and W - Western. The objectives and the States cooperating are shown.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

BEEF CATTLE

Breeding and Genetics

- Ala. The Improvement of the Beef Cattle of Alabama Through Breeding Methods. To (1) investigate principles of breeding beef cattle that can be used in production of milk-fat calves, (2) determine how rapidly the performance of native cattle of this area can be improved by use of purebred sire program, (3) determine amount of improvement in performance that can be made in established beef breeds by selection, with attention only on performance characters, (4) study importance of heterosis in a grading up program in production of milk-fat calves, and (5) study value of Brahman breeding in rotation sires program, using native cattle as foundation stock.
An. Husb. 525, (S-10), Coop. ARS
- Ariz. Progeny Testing of Hereford Sires. To investigate productiveness of different Hereford sires as reflected in growth capacity of their progeny and to develop inbred lines that will be useful in improvement of this character.
An. Husb. 279, (W-1), Coop. ARS
- Ark. The Determination of Adequate Records-of-Performance Tests for Beef Cattle. To develop practical but adequate methods for evaluating the breeding worth of beef sires and dams.
An. Ind. 170, (S-10), Coop. ARS
- Calif.
(Davis) Genetic Control of Hereditary Deficiencies in Beef Cattle with Special Emphasis on Dwarfism. To refine methods used for differentiating dwarf-carrier and dwarf-free mature horned Hereford bulls and lower the age at which the two genotypes can be recognized; and identify dwarf-carrier and dwarf-free genotypes in horned Hereford cows.
An. Husb., Vet. Med. 1451, (W-1), Coop. ARS
- Colo. A Study of Selection, Inbreeding and the Crossing of Inbred Lines Within the Hereford Breeds. To (1) study effect of intensive inbreeding of various traits in beef cattle, (2) study effect of crossing inbred lines and determine how inbred lines may best be used in producing maximum amount of hybrid vigor, and to provide information on the nature of heterosis in beef cattle, (3) study heritabilities of various traits of economic importance and genetic correlations between these traits in order that more effective selection procedures may be developed, and (4) obtain the following additional information: a. What effect does inbreeding have on the rate of blood antigen loss in Hereford cattle? b. To what extent can the antigen picture be used as an index of genetic diversity between inbred lines? c. The use of inbred lines in providing test material for various means of detecting dwarfism in heterozygous condition of Hereford cattle. d. What techniques are most useful in performance testing of beef bulls? e. Study of endocrine pattern of performance tested cattle as revealed by studies of the pituitaries, thyroids, and adrenals.
An. Ind. 26, (W-1), Coop. ARS

Ga.

The Relative Productive Value of Various Crossbreeding Systems for Use with Livestock. To learn (1) productive value of crosses and rotational breeding systems, (2) how single and double crosses compare, and comparison with a random-bred population, (3) comparison of 2, 3, and 4 lines or populations used in a rotational program, with single and double crosses, and with a random-bred population, (4) how many different populations should be used in a rotational program to get maximum economic performance, and (5) how performance of a rotation can be predicted from lines performance or single cross performance.

An. Husb. 91

Hawaii

The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) develop inbred lines of beef cattle that are useful in improvement of characters such as rate of gain, economy of gain, carcass quality, fertility and longevity, (2) develop effective breeding techniques for improving productiveness of beef cattle, and (3) investigate productiveness of existing lines of cattle.

An. Husb. 268, (W-1)

Idaho

The Improvement of Beef Cattle Through the Application of Breeding Methods: (1) Linebreeding Within the Hereford and Shorthorn Breeds; (2) By Testing Linebred Sires Within the Various Lines Which will be Developed. To develop lines of beef cattle that will result in improvement in such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality.

An. Husb. 8, (W-1), Coop. ARS

Ill.

Improving Beef Cattle Through Breeding and Selection. To (1) develop strains of beef cattle which have exceptional ability to (a) grow or (b) fatten on pasture and roughages, (2) maintain control line without selection under the same conditions in order that progress may be measured and heritability estimates made, and (3) study the relationship of various important production traits of beef cattle.

An. Sci. 20-372, (NC-1)

Iowa

Improvement of Beef Cattle Through Breeding Methods. To establish inbred lines of Aberdeen Angus, Hereford, and Shorthorn cattle; develop methods of selection for improving lines, and determine possible intensity of inbreeding.

An. Husb. 1055, (NC-1), Coop. ARS

Kans.

Development of Superior Lines of Shorthorn Cattle. To (1) develop superior line of Shorthorns, and maintain detailed record of its progressive development, (2) determine practicability of inbreeding for establishing superior line when herd consists of less than 40 females of breeding age, (3) develop tested procedure and other techniques for evaluation of breeding animals, and (4) collect data on inheritance of physical characteristics of Shorthorn cattle.

An. Husb. 286, (NC-1), Coop. ARS

- Ky. A Performance and Progeny Testing Program for Bulls of the Beef Breeds. To (1) use weaning weights, rate of gain, efficiency of gain, and conformation of beef bulls in developing index for predicting their value in breeding herd, (2) use experimental results and experience of participants as means of calling attention of beef breeders to variation in performance of purebred bulls of similar appearance both on feed and in breeding pen, and (3) breed relatively good and relatively poor bulls to uniform groups of cows to test heritability of rate and efficiency of gain in feeder calves.
An. Ind. 72, (S-10)
- La. Comparisons of Various Crossbred and High Grade Cattle Under Gulf Coast Conditions with Respect to Rate of Growth on Pasture, Fattening Ability, and Meat Quality of Steers. To (1) develop types of beef cattle suited to conditions along the Gulf Coast, (2) determine efficiency of various breeds and crosses for economical beef production under Louisiana conditions, and (3) accumulate data which, when interpreted, will be of use to livestock breeders.
An. Ind. 605, (S-10), Coop. ARS
- Maine Problems Related to the More Efficient Production of Beef Cattle in Maine. To improve efficiency of beef cattle production by (1) breeding methods, including (a) determination of average daily gain from weaning to 12 months of age, (b) determination of efficiency of feed use (feed consumed per 100 lbs. gain), and (c) study of breeding systems, using records of performance in (a) and (b); and (2) feeding methods, including (a) study of value of rations made of feeds readily available in Maine, and (b) determination of most efficient procedure in handling feeds.
An. Ind. 24
- Md. A Study of the Productiveness of Purebred Beef Cattle in Maryland. To (1) study productiveness of beef cattle including rate and economy of gain, market type, carcass quality, fertility, longevity, etc., (2) compare selection criteria with actual performance, (3) evaluate breeding techniques under varying conditions in purebred herds, and (4) attempt to produce beef cattle with superior productive capacities by linebreeding and selection.
An. Husb. C-14, (S-10)
- Md. Effect of Early Weaning of the Duration of Maternal Influences in Beef Calves. To (1) attempt to develop a new technic for an earlier evaluation of feed lot performance, progeny testing and genetic evaluation of beef animals, (2) develop sound feeding and management practices for early weaned calves, and (3) evaluate calves' genetic ability to thrive under new systems of care.
An. Husb. C-14-a, (S-10)
- Md. Type Classification as an Aid in Selection of Beef Breeding Cattle. To determine value of type classification in beef cattle, i.e., heritability of beef type and production.
An. Husb. C-14-b, (S-10)

- Md. Group Versus Individual Feeding of Weaned Beef Calves. To (1) evaluate accuracy of group versus individually fed calves as technique in testing of sire-progeny groups, (2) study possibility of forecasting productiveness of beef calves by using single or combined measurements taken on live animals, (3) study value of scores taken on live animals in relation to forecasting their performance, (4) compare measurements and scores in order to search for objective methods of determining scores, and (5) study absolute and relative changes in measurements and scores from one age to another.
An. Husb. C-14-d, (S-10), Coop. ARS
- Mich. The Effectiveness of Selection in Beef Cattle Improvement. To (1) establish measurements of most efficient beef cattle through study of rate of gain, efficiency of gain, breeding efficiency and carcass desirability, (2) develop and test methods of selection effective in accomplishing the above, (3) collect data on weaning weights, rate of gain, efficiency of gain and conformation to make possible a study of heritability of these characters, and (4) attempt to discover strains of cattle that excel in qualities listed under (1).
An. Husb. 96, (NC-1)
- Miss. A Study to Determine the Breeding Worth of Inbred and Outbred Bulls From Various Sources. To (1) compare growth rate, carcass quality, and maternal ability of progenies of bulls chosen as potentially superior sire, (2) develop high producing herd of cows using progeny of good producing bulls as replacements, and (3) determine effectiveness of selection index when used on heifers at weaning time.
An. Husb. 1, (S-10), Coop. ARS
- Mo. Improvement of Beef Cattle Through Breeding. To (1) develop more effective methods of selection for the improvement of performance in beef cattle, (2) develop more accurate and useful measurements of performance in beef cattle, (3) further test techniques of identifying "dwarf-free" and "dwarf-carrier" beef cattle, and (4) compare performance of "carrier" and "non-carrier" beef cattle.
An. Husb. 198, (NC-1), Coop. ARS
- Mont. The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) establish inbred lines of Herefords, both horned and polled, that will result in improvement of such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality, (2) establish an improved herd of registered Angus cattle in which males are selected on high performance level as indicated by standard record of performance procedures, and (3) investigate feasibility of breeding for specific combining ability through recurrent selection.
An. Ind. and Range Mgt. 104, (W-1), Coop. ARS
- Nebr. Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) establish and evaluate selection criteria for improving performance in beef cattle, (2) determine inheritance of productive and deleterious characters, and methods for controlling them, (3) evaluate usefulness of various mating systems such as inbreeding, outbreeding, crossbreeding, or phenotypic assortative mating, (4) develop breeding procedures for improving performance of beef cattle, (5) develop lines of cattle with improved breeding value for such characters as rate and economy of gain, fertility, nursing ability and carcass quality, and (6) evaluate usefulness of existing stocks of beef cattle and their adaptability in various areas under different systems of management.
An. Husb. 334, (NC-1), Coop. ARS

Nev.

The Effect of Environment of Selection for Traits of Economic Importance, The Relative Value of Several Selection Criteria; and Reproductive Studies in Range Beef Cattle. To determine (1) effect of environment of effectiveness of selection for several traits of economic importance in range beef cattle, (2) evaluate genetic-environmental interaction between area and method of production and several traits of economic importance in range beef cattle, (3) relative importance of rate of gain, economy of gain and a selection index based on overall merit as selection criteria for range beef cattle, including: a. additional criteria to be developed and studied, b. study of measures of "efficiency of food utilization" and attempts to develop more satisfactory measures, and c. growth and development studies in range cattle, and (4) effect of reproductive efficiency on selection in range cattle, including: a. attempts to develop a practicable early-pregnancy diagnostic method, b. relation of time or rate of maturation and fertility, c. attempts to determine and evaluate causes of infertility in range cattle, and d. attempts to develop a practicable method of synchronizing estrous cycle in range cattle.

An. Husb., Agron. and Range Mgt., Vet. Sci., Agr. Chem. 77,
(W-1), Coop. ARS

N. Mex.

Breeding Beef Cattle for Southwestern Ranges. To (1) determine or gather more information on the heritability of weight and grade at weaning, at yearling, and at maturity, (2) a. continue efforts to determine heritability of type and size, b. measure relative influence of sire and dam on offspring, c. determine feasibility of mating compact cows with large bull and large cows with compact bulls, and d. continue observations on hardness, longevity, and reproductive efficiency of cows of two types, (3) gain more information on the heritability of carcass yield and grade, (4) a. develop methods of establishing lines of cattle free from dwarf genes, and b. establish a line of purebred Hereford cattle free of dwarf gene, or, if this proves impossible, a line in which the dwarf gene has a low frequency, (5) gain more information on heritability of type or form, (6) study influence of size and type of cattle on feed use and feed lot performance, (7) establish procedures or breeding plans to improve range cattle by making use of information gained in first 2 objectives, and (8) develop a line of purebred Hereford cattle adapted to range production in the Southwest.

An. Husb. 21, (W-1), Coop. ARS

N. C.

The Improvement of Beef Cattle Through Breeding Methods. To develop and evaluate selection criteria for the improvement of productive efficiency and market quality of beef cattle.

An. Husb. 74, (S-10), Coop. ARS

Ohio

The Improvement of Beef Cattle Through Breeding Practices. To (1) test existing inbred lines of Hereford cattle for general combining ability, (2) compare the get of production bred inbred Hereford sires with those of regular outbred sires, (3) preserve superior germ plasm which may be found in bulls used, and (4) evaluate selection criterion and develop procedures for improving performance of beef cattle.

An. Sci. 70, (NC-1)

- Okla. The Improvement of Beef Cattle by the Application of Breeding Methods. To (1) develop practical measures of performance and selection procedures for beef cattle handled under range conditions, (2) develop improved beef cattle by selection and milk inbreeding, (3) compare breeding and feeding performance of small and large type cattle, and (4) study individual variation and heritability of economically important traits in beef cattle.
An. Husb. 670, (NC-1), Coop. ARS
- Oreg. The Improvement of Beef Cattle Through the Application of Breeding Methods. To develop (1) inbred lines of beef cattle that will be useful in improvement of rate of gain, economy of gain carcass quality, fertility and longevity, and (2) effective breeding techniques in improving productiveness of beef cattle.
An. Husb. 1, (W-1), Coop. ARS
- S. C. The Use of Brahman and Certain British Breeds of Beef Cattle in the Production of Fat Calves. To determine birth and weaning weights, market grades, carcass grades and dressing percentages of fat calves sired by Brahman, Hereford and Angus bulls.
An. Husb. 25, (S-10), Coop. ARS
- S. Dak. The Improvement of Beef Cattle Through Breeding. To study (1) usefulness of inbreeding and subsequent crossing as a mating system, (2) study suitable methods of selection to be used independently and in conjunction with first objective, (3) investigate the productiveness of existing beef cattle, (4) test on farm bulls produced under (1) and (2), (5) compare bulls produced by different mating systems or selected on different bases when bred to comparable groups of cows, and (6) study various characteristics of heterozygous and normal beef cattle in an attempt to find a simple means of distinguishing between them.
An. Husb. 167, (NC-1), Coop. ARS
- Tenn. The Improvement of the Producing Ability of Beef Cattle. To (1) develop lines, crosses or combinations of beef cattle that will make most efficient use of Tennessee pastures and forages and result in an improvement of rate and economy of gain, carcass quality, fertility and longevity, (2) develop effective breeding techniques for improving productiveness of existing lines, (3) investigate productiveness of existing lines, and (4) test effect of different levels of nutrition on development of type, conformation, fertility and longevity.
An. Husb., Vet. Sci. 15, (S-10)
- Tenn. The Detection of Animals Heterozygous for Recessive Bovine Dwarfism. To investigate methods of identifying at young ages animals heterozygous for recessive bovine dwarfism.
An. Ind. 86, (S-10), Coop. ARS
- Tex. Improvement of Beef Cattle Within Pure Breeds and Certain of Their Crosses Through Breeding Methods, Based on Evaluation Tests for Efficiency and Rate of Gain, Heat Tolerance, and Carcass Value. To (1) improve beef cattle by selection based on rate and economy of gain, breeding efficiency, and carcass value, (2) evaluate cattle for adaptability to environment, especially heat tolerance, (3) develop a strain especially adapted to southern climatic conditions, using Brahman cattle and a European breed, and (4) improve carcass value of predominantly Brahman breeding by introducing characteristics from European breeds.
An. Husb. 650, (S-10), Coop. ARS

Tex.

Biochemical and Physiological Anomalies of Bovine Dwarfism and Their Use in Detection of Heterozygotes. To (1) detect biochemical and physiological anomalies associated with bovine dwarfism, in attempt to identify metabolic defect(s) causing dwarfism, (2) learn extent to which biochemical and physiological factors which are anomalous in dwarfs vary in normal animals, (3) learn usefulness of variation of these factors in distinguishing between normal carriers and non-carriers of the genes conditioning dwarfism, and (4) use these factors in further study of mode of inheritance of dwarfism in beef cattle.

Biochem. and Nutr., An. Husb. 959, (S-10), Coop. ARS

Tex.

Methods for Measuring Potential Rate of Gain and Efficiency of Feed Utilization in Immature Beef Cattle. To develop methods of (1) biochemical or physiological nature which will measure in the immature animal, the potential rate of gain, and (2) measurement of the potential efficiency of use of feed for building body tissue.

Biochem and Nutr., An. Husb. 714, (S-10), Coop. ARS

Utah

The Improvement of Beef Cattle Through the Application of Breeding Methods. To test and develop lines of Hereford and Shorthorn cattle that will result in improved rate and economy of gain, fertility, nursing ability, carcass quality and longevity when maintained under Utah conditions. To investigate the productiveness of a line of Herefords founded on Advance Domino III, 2837737, and a line of Shorthorns founded on Cadet's Guard, 2098399.

An. Husb. 280, (W-1), Coop. ARS

Va.

The Improvement of Beef Cattle for Virginia Through Breeding Methods. To study productivity of stocks now in use, and develop methods for estimating the breeding value with respect to type, growth rate and efficiency of young bulls.

An. Husb. 9371, (S-10), Coop. ARS

Wash.

The Improvement of Beef Cattle Through the Application of Breeding Methods: (1) Moderate Inbreeding Within the Hereford, Aberdeen-Angus and Shorthorn Breeds: (2) By the Testing of Inbred Sires Within the Various Lines Which will be Developed. To develop lines of beef cattle that will result in improvement in such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality.

An. Husb. 788, (W-1)

Wis.

The Importance of Genetic and Environmental Influence on Characteristics of Economic Value in Beef Cattle. To (1) establish for beef cattle the relative effect of genetic and environmental influences on characteristics of economic importance which may be used in the development of a selection index, and (2) analyze physiological relationship between these important characteristics.

An. Husb., Genetics 871, (NC-1).

Wyo.

The Improvement of Beef Cattle Through the Application of Breeding Methods. To determine (1) if body score, weight and measurement of calves at weaning is correlated to age of dam in Angus, Hereford and Shorthorns, (2) if body score, weight and measurement of cattle one year and over are correlation to body score, weight and measurement of their dams, (3) if body score of dam and sire can be used with any degree of accuracy to predict body score of progeny, (4) estimates of heritability for those factors considered, and (5) rate of gain and efficiency of feed use for all progeny retained past weaning.

An. Prod. 397, (W-1)

Wyo.

Blood Typing Beef and Dairy Cattle to Study Possible Association of Blood Groups with Economic Characteristics. To (1) study possibility of genetic association between blood groups and economic characters, (2) study possibility of genetic association between blood groups and dwarfism, (3) study effect of inbreeding and/or linebreeding on blood group frequency, (4) establish possibility of, or disestablish parentage in doubtful cases, (5) search for additional blood groups in known blood systems, and for additional blood systems, and (6) study effect of, and control measure for anaphylaxis in immunized animals.

An. Prod., Vet. Sci. 556

Wyo.

A Study of the Significance of Head Form in Beef Cattle. To (1) study the pattern of head form development in young beef animals, (2) establish the association, if any, between head form development, and the dwarf factor and other economic factors such as early maturity, weight for age, and rate and efficiency of gain in beef cattle, and (3) study the inheritance of head form in beef cattle.

An. Prod. 610, (W-1)

Reproduction and Lactation

Calif.
(Davis)

Physiology of the Domestic Animals. To study the physiology of (1) reproduction, (2) ruminant stomach, and (3) the parathyroid gland as a control mechanism for the Ca level of the blood.

An. Husb. 941

Ill.

Pasture Investigations. XV. The Age at Which to Breed Beef Heifers. To compare (1) effect on size and mature weight of cows bred as yearlings to calve at 2 years of age as compared with cows bred as 2-year-olds to calve at 3 years of age, (2) size of offspring of initial and subsequent calvings of these two groups, (3) total pounds of beef a cow will produce at weaning time during the more productive years of her life, depending upon whether she was bred initially as a yearling or as a 2-year old; and to study effect on later breeding regularity of heifers bred as yearlings as compared with heifers bred as 2-year olds.

An. Husb. 40-315, Coop. SCS

Mich.

Hormone Studies Related to the Physiology of Domestic Animals Including Investigations with Radioactive Isotopes. To study (1) thyroid physiology of laboratory and domestic animals, (2) nutritional hormonal interrelationships during growth and reproduction, (3) effects of hormones on growth maturation and reproduction, (4) relation of hormones to milk secretion, and (5) metabolism of hormones in the animal body.

Poul. Husb., Physiol. and Pharmacol., An. Husb. 25

Miss.

A Study to Determine the Use of Exogenous Progesterone in the Control of the Reproductive Phenomena in Beef Cows. To (1) determine dosage of progesterone needed in beef cattle to best control ovaries in production of viable ova. (2) determine effect of various dosages on endometrium as shown by survival and development of viable ova, and (3) when a most optimum dosage is found, conduct a second experiment comparing results from this dosage when used on another group of cows, with results from a comparable group of nontreated control animals.

An. Husb. FE-7

Mo.

Beef Cattle Feeding and Management. To (1) determine advantages and disadvantages accruing to January-February and March-April dropped calves when both groups are fed grain while suckling dams on pasture and fattened, post weaning to same degree of finish, (2) discover production needs of "improved" pastures, concentrates, and management, (3) study carcass quality and grade, and (4) unveil production problems currently unrecognized.

An. Husb., Agr. Chem., Econ. 78

Mo.

Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To (1) make a thorough study of the chemistry and/or biochemistry of male and female germ cells in order to gain knowledge which is needed as a basis for future investigations involving: a. ova and spermatozoa storage and preservation, b. artificial insemination, c. ova transfer, d. fertilization mechanism, and e. chemistry and physiology of gene action; (2) investigate the enzyme systems and metabolic activities of male and female gametes, the results of these studies being basic requirements for further work on storage media, cold shock phenomenon of spermatozoa, low temperature storage of ova and spermatozoa, and possibly to other reproductive processes or activities affecting fertility and litter size; (3) characterize and isolate certain factors present in egg yolk, boiled milk, chick embryos and other biological tissues which aid in preservation of the viability of spermatozoa of farm animals and protect them against a number of adverse environmental conditions including sudden lowering of temperature; and (4) make further investigations into the physical requirements of male and female germ cells.

An. Husb. 81

N. J.

Factors Influencing the Ability of Beef Cows to Produce Milk. To determine the influence of (1) injecting an estrogen and thyroprotein feeding on duct growth in the udder of a beef heifer, and (2) estrogens on the mammary glands of hyperthyroid guinea pigs.

An. Husb., Dairy Husb. 130

Tenn.

The Effect of Radiation on Reproductive Physiology in Farm Animals. To evaluate effects of acute and chronic irradiation on reproductive physiology and growth in farm animals on: 1. semen characteristics, 2. potential fertility in male, 3. estrual cycle phenomena in female, 4. potential fertility in female, 5. endocrine system, and 6. growth of young animals.

An. Husb., Vet. Sci. 65, Coop. ARS

W. Va.

Reproductive Efficiency of Beef Cattle. Learn practicability and effects of breeding beef cows at first heat after delivery, incidence of ovulatory anomalies in cattle and their effects on reproduction, and compare reproductive efficiencies of two breeds of beef cattle when managed under like conditions.

An. Husb. 69

Feeding and Nutrition

A. Pasture and Roughage

- Ark. Methods of Improving the Digestion and Utilization by Beef Cattle of Roughages Produced in the South. To (1) improve digestion and use of roughages by beef cattle thru proper supplementation, and (2) obtain further information on relation of digestion and use of southern grown roughages to changes in physical and chemical composition of plants as effected by methods of management and handling.
An. Ind., Vet. Sci. 371

- Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin and combinations) and fibrous feeds, by rats, pigs, cattle and sheep thru use of ad libitum and paired feedings, N balance, and digestibility, (2) make chemical studies on methods of analysis and isolation of fibers, and (3) apply findings to the utilization of forage.
(Davis)
An. Husb., Engin., Agron. 1569

- Calif. Nutritive Value of Specific Range Forages Species as Influenced by Seasons, Fertilization and Management. To learn (1) techniques for measuring consumption, a. esophogostomy, b. clipping, c. hand selection, d. reference substances-lignin, chromic oxide, chromogens, and (2) nutritive value of specific range species, a. chemical composition b. digestibility, c. mineral availability, d. fiber utilization.
(Davis)
An. Ind., Agron. 1670, (W-34)

- Colo. An Investigation of Unidentified Nutritional Factors in Alfalfa and Certain Range Plants. To (1) study and identify unidentified nutritional factors in alfalfa and various browse types indigenous to Colo. range-land, which are known to enhance the over-all value of rations to which they are added, (2) determine manner in which such substances as stated above, act to supplement or improve rations in which they are included, and (3) determine optimum levels of supplementation of above mentioned factors.
An. Ind., Dairy Husb. 176

- Colo. The Value of Native and Seeded Range Grasses and Supplementation Required in the Nutrition of Beef Cattle. To (1) study the nutritive value of native and seeded range grasses grazed in rotational pattern by beef cattle, (2) investigate by chemical analysis seasonal changes in nutrient contain of native and seeded range plants, (3) determine nutrient losses from range cover to rodents, insects, weathering, and trampling cattle, and (4) study the effect on beef production of protein supplementation regarding to balance seasonal nutrient variation in range grasses.
An. and Dairy Ind. 229, (W-34)

- Fla. Herbage Composition and Animal Response as Influenced by Pasture Management. To evaluate nutritional qualities of herbage grown under specified conditions in terms of animals response and of the composition of the herbage.
An. Husb., Nutr. 356

- Ga. Forage Consumption and Methods of Wintering Beef Cows on Pasture. To determine the value of (1) hay in addition to grazing while on winter pastures, and (2) cost of wintering cattle on winter pasture versus dry lot feeding.
An. Ind., Chem. 47
- Ga. The Fattening of Beef Calves on Winter Pasture. To determine (1) value of different winter clovers and grasses for fattening beef calves, (2) effect of addition of grain to steers while fattening in winter pasture, and (3) effects of above feeds on rate of gain, economy of gain, finish, market price, meat quality, refractive index and health of animals at 14-16 months.
An. Ind. 48
- Ga. Maximum Use of Summer Grown Roughage in a Steer Fattening Program. Study use of maximum amounts of spring and summer grown roughages, hay or silage, fed with different kinds and levels of grain supplementation in a steer fattening program.
An. Husb. 50, Coop. ARS
- Ga. Use of Annual Winter Pasture for Fattening Steers in the Costal Plain of Georgia. Study value of annual winter pastures in steer fattening program when grazed alone and when supplemented with limited amounts of various carbohydrates and roughages.
An. Ind., Agron. 108, Coop. ARS
- Idaho Beef Cattle Nutrition on Seeded and Native Forage in Idaho. To determine the nutrient content, total digestible nutrients, and digestible energy of forage consumed by cattle when grazing at different intensities and seasons of use on: (a) Seeded areas (primarily crested wheatgrass) (b) Native forage or unseeded areas; determine the effect of intensity of grazing on nutrient intake and livestock production, i.e., weight, calf crop, grade, etc.; determine the need for and value of various nutritional supplements for cattle subjected to the above grazing treatments; and to apply the nutritional results obtained to better beef cattle production and range management practices.
An. Husb., Agr. Chem. 46, (W-34), Coop. ARS
- Ill. Comparative Value of Pelleted Versus Loose Forage Crops for Beef Cattle Feeding. To compare alfalfa fed as long hay, chopped hay, pellets and silage as to gains, feed consumption, palatability, and economy in wintering steer calves.
An. Sci. 40-329
- Ill. Studies on Protein and Carbohydrate Metabolism in Ruminants, Especially as Affected by Rumen Microorganisms. Increase efficiencies in those metabolic processes of rumen microorganisms by which nutritional demands of ruminants may be satisfied.
Dairy Sci. 35-315

Feeding and Nutrition

A. Pasture and Roughage

Ark. Methods of Improving the Digestion and Utilization by Beef Cattle of Roughages Produced in the South. To (1) improve digestion and use of roughages by beef cattle thru proper supplementation, and (2) obtain further information on relation of digestion and use of southern grown roughages to changes in physical and chemical composition of plants as effected by methods of management and handling.

An. Ind., Vet. Sci. 371

Calif.
(Davis) Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin and combinations) and fibrous feeds, by rats, pigs, cattle and sheep thru use of ad libitum and paired feedings, N balance, and digestibility, (2) make chemical studies on methods of analysis and isolation of fibers, and (3) apply findings to the utilization of forage.

An. Husb., Engin., Agron. 1569

Calif.
(Davis) Nutritive Value of Specific Range Forages Species as Influenced by Seasons, Fertilization and Management. To learn (1) techniques for measuring consumption, a. esophogostomy, b. clipping, c. hand selection, d. reference substances-lignin, chromic oxide, chromogens, and (2) nutritive value of specific range species, a. chemical composition b. digestibility, c. mineral availability, d. fiber utilization.

An. Ind., Agron. 1670, (W-34)

Colo. An Investigation of Unidentified Nutritional Factors in Alfalfa and Certain Range Plants. To (1) study and identify unidentified nutritional factors in alfalfa and various browse types indigenous to Colo. range-land, which are known to enhance the over-all value of rations to which they are added, (2) determine manner in which such substances as stated above, act to supplement or improve rations in which they are included, and (3) determine optimum levels of supplementation of above mentioned factors.

An. Ind., Dairy Husb. 176

Colo. The Value of Native and Seeded Range Grasses and Supplementation Required in the Nutrition of Beef Cattle. To (1) study the nutritive value of native and seeded range grasses grazed in rotational pattern by beef cattle, (2) investigate by chemical analysis seasonal changes in nutrient contain of native and seeded range plants, (3) determine nutrient losses from range cover to rodents, insects, weathering, and trampling cattle, and (4) study the effect on beef production of protein supplementation regarding to balance seasonal nutrient variation in range grasses.

An. and Dairy Ind. 229, (W-34)

Fla. Herbage Composition and Animal Response as Influenced by Pasture Management. To evaluate nutritional qualities of herbage grown under specified conditions in terms of animals response and of the composition of the herbage.

An. Husb., Nutr. 356

- Ga. Forage Consumption and Methods of Wintering Beef Cows on Pasture. To determine the value of (1) hay in addition to grazing while on winter pastures, and (2) cost of wintering cattle on winter pasture versus dry lot feeding.
An. Ind., Chem. 47
- Ga. The Fattening of Beef Calves on Winter Pasture. To determine (1) value of different winter clovers and grasses for fattening beef calves, (2) effect of addition of grain to steers while fattening in winter pasture, and (3) effects of above feeds on rate of gain, economy of gain, finish, market price, meat quality, refractive index and health of animals at 14-16 months.
An. Ind. 48
- Ga. Maximum Use of Summer Grown Roughage in a Steer Fattening Program. Study use of maximum amounts of spring and summer grown roughages, hay or silage, fed with different kinds and levels of grain supplementation in a steer fattening program.
An. Husb. 50, Coop. ARS
- Ga. Use of Annual Winter Pasture for Fattening Steers in the Costal Plain of Georgia. Study value of annual winter pastures in steer fattening program when grazed alone and when supplemented with limited amounts of various carbohydrates and roughages.
An. Ind., Agron. 108, Coop. ARS
- Idaho Beef Cattle Nutrition on Seeded and Native Forage in Idaho
To determine the nutrient content, total digestible nutrients, and digestible energy of forage consumed by cattle when grazing at different intensities and seasons of use on: (a) Seeded areas (primarily crested wheatgrass) (b) Native forage or unseeded areas; determine the effect of intensity of grazing on nutrient intake and livestock production, i.e., weight, calf crop, grade, etc.; determine the need for and value of various nutritional supplements for cattle subjected to the above grazing treatments; and to apply the nutritional results obtained to better beef cattle production and range management practices.
An. Husb., Agr. Chem. 46, (W-34), Coop. ARS
- Ill. Comparative Value of Pelleted Versus Loose Forage Crops for Beef Cattle Feeding. To compare alfalfa fed as long hay, chopped hay, pellets and silage as to gains, feed consumption, palatability, and economy in wintering steer calves.
An. Sci. 40-329
- Ill. Studies on Protein and Carbohydrate Metabolism in Ruminants, Especially as Affected by Rumen Microorganisms. Increase efficiencies in those metabolic processes of rumen microorganisms by which nutritional demands of ruminants may be satisfied.
Dairy Sci. 35-315

- Ind. Effect of Alteration of Diets on Digestive Disturbances of Ruminants. To (1) determine to what extent alteration of ratio of different constituents in diet affects ruminant digestion, (2) determine if acute bloat or engorgement toxemia occur as a result of changes, and (3) develop practical means to prevent and treat both diseases.
Vet. Sci., Biochem. 724
- Ind. Biochemical Aspects of Ruminant Bloat. To (1) determine what constituents of feeds and forages increase the incidence of bloat, and (2) to determine what biochemical compounds and reactions are involved in bloat.
Vet. Sci., Biochem., Agron. 828
- Ind. Influence of Winter Gains and Level of Grain Feeding on Pasture Upon the Output of Beef Per Acre. To (1) establish the quantitative relationship between the level of winter feeding of yearling steers and their subsequent output of beef per acre from unsupplemented pasture, (2) determine the influence of supplemental grain feeding on pasture upon the output of beef per acre, (3) determine the interaction of the level of winter feeding and level of grain feeding on pasture, and (4) determine the most economical combination (s) of level of winter feeding and grain feeding on pasture.
An. Husb., Agr. Econ. 827
- Ind. Balancing Roughages for Growing and Fattening Cattle. To (1) test effect of certain modifications of Purdue Cattle Supplement A on use of roughage by cattle, (2) compare nutritive value of various roughages for growing and fattening cattle, and (3) determine other factors essential for roughage use and study nutritive value of such roughage as corn stover, wheat straw, oat hulls, peanut hulls, etc.
An. Husb. 692
- Iowa Increasing the Usefulness of Forage Crops and High-Cellulose Roughages by Improved Rumen Function (Zymo-Chemistry) in Beef Cattle and Sheep. To (1) increase usefulness of forage crops and high-cellulose roughages thru improved rumen function or improved bacterial digestion within rumen of beef cattle and sheep, and (2) work for better nutrition in cattle and sheep resulting from improved rumen function especially in those animals subsisting largely upon low-grade roughages and forages.
An. Husb., Dairy Husb., Chem. 1208
- Iowa Physical and Chemical Aspects of Bloat. To (1) study effect of dietary components and therapeutic agents on physical and chemical characteristics of rumen ingesta, (2) determine relation of dietary characteristics to incidence of bloat, (3) determine various physical and chemical characteristics of rumen ingesta and of blood and other tissues from bloated animals, (4) ascertain efficacy of prophylactic procedures and therapeutic agents, and (5) determine relation of physical characteristics of animal to incidence of bloat.

- Kans. Factors Influencing Profitable Grass Utilization and Sound Pasture Management. Wintering and Grazing Steer Calves. To determine effects of different wintering regimes on subsequent pasture gains and the value of supplements fed after mid-summer.
An. Husb. 253-1
- Kans. Factors Influencing Profitable Grass Utilization and Sound Pasture Management. Wintering, Grazing and Fattening Heifers. To (1) develop a system of deferred full feeding for heifer calves, (2) compare different rations for heifers, and (3) compare various methods of finishing heifers.
An. Husb. 253-2
- Kans. Factors Influencing Profitable Grass Utilization and Sound Pasture Management. Wintering and Grazing Yearling Steers. To (1) develop methods of wintering and grazing yearling steers, (2) determine optimum level of protein feeding during the winter on dry bluestem pasture, and (3) determine effect of feeding a protein supplement during latter part of grazing season to 2 year old steers on bluestem grass.
An. Husb. 253-4
- Kans. Factors Influencing Profitable Grass Utilization and Sound Pasture Management. Wintering, Grazing, and Fattening Steers. To (1) compare self-feeding grain on grass after August 1 with self-feeding grain in dry lot, and (2) determine value of trace minerals in cattle program which uses bluestem pasture.
An. Husb. 253-6
- Kans. Fundamental Nutrition Studies of Sorghum Roughages and Grains.
II. A Study of the Digestibility of Sorghum Silage. To determine the coefficients of digestibility of sorghum silage when fed alone and in conjunction with a high-protein concentrate.
An. Husb., Chem. 222-2
- Kans. A Study of the Intermediary Metabolism of Rumen Microorganisms with Reference to the Formation of End Products From the Carbohydrates of Roughage. Elucidate mechanisms in formation of end products, as fatty acids, from the carbohydrates of roughage. Study inter-relationship of apparently nonuseful end product methane with production of useful carbonaceous end products. Isolate enzyme systems capable of carrying on one step reactions found in carbohydrate fermentation.
Bact., Dairy Ind., An. Ind. 425

- Ky. The Values of Urea and of Synthetic Alfalfa Ash in a High Roughage Ration for Fattening of Steers in Drylot. To perfect synthetic alfalfa ash that will produce as much or more beneficial effect on gains as will true alfalfa ash when fed in a ration containing a high level of low-quality roughage to steers in drylot.
An. Husb., 71
- Ky. Factors Affecting the Utilization of Low-Quality Roughage by Stocker Steers. Learn effects of adding following materials to rations composed principally of low-quality roughage and used for purpose of wintering stocker feeders that are to be grazed without grain following season: (1) corn distillers dried grains with solubles, (2) alfalfa meal, (3) trace minerals, (4) urea, and (5) molasses.
An. Ind. 86
- La. Comparison of Roughages for Winter Feeding and Maintenance of Beef Cattle. To (1) continue the study and comparison of feeding value of roughages available in Louisiana for wintering beef cattle, and (2) determine relative value of concentrate mixture when fed with available roughages commonly found in Louisiana.
An. Husb. 782
- Mass. Quality in Roughage: Phase I. A Study of the Factors Which Influence Composition, Palatability, and Value for Milk Production of Roughages (Hay and Silage) Grown in Northeastern United States Phase II. The Nutritive Evaluation of Forage by Means of Production Trials and Laboratory Tests. To (1) determine the value for milk production of forages grown for that purpose in this region, with special emphasis on those crops or combinations of crops of relatively recent introduction in comparison with others that are more or less indigenous, (2) determine the effect on nutritive value of forage crops (both those recently introduced and the indigenous species and combinations) of increased use of fertilizers and improved methods of harvesting and storing, and (3) to correlate the results of milk production trials of these crops with chemical analyses and other potential indicators of forage quality in the search for a relatively simple test that might be used as criterion for quickly judging the nutritive value of forages.
Agron., An. Husb., Chem., Feed Control Lab. 1038, (NE-24)
- Mass. Effect of Various Silages on Fatty Acid Levels in the Mature Bovine Rumen. To (1) ascertain levels of total steam volatile fatty acids in mature bovine rumen when various silages are fed, and (2) compare relative proportions of acetic, propionic, and butyric acids produced under these conditions.
An. Husb. 1025
- Mich. The Use of Nitrogenous Materials in Ruminant Nutrition. To (1) determine optimum protein levels needed to obtain maximum use of roughages, (2) determine extent to which urea or other simple N sources can be used in place of natural protein, and (3) establish role of other nutrients such as trace minerals and organic growth promoting factors required to produce maximum digestion of cellulose and other rather indigestible components of feeds.
An. Husb., Agr. Chem. 118

- Minn. Bloat Producing Mechanisms in Ruminants. To (1) attempt to clarify presently poorly understood motor control mechanisms in the ruminant stomach, with particular reference to the forestomachs, and (2) attempt to develop a bioassay procedure for toxic, bloat-producing legume extracts.
Vet. Sci., Dairy Husb., Agr. Biochem. 2624
- Miss. Methods of Finishing Yearling and Two Year Old Steers for Market. To determine the relative value of (1) various methods of finishing steers as yearling and 2-year old on pasture with and without an additional feeding period of oats and wheat, and (2) sod-seeded pastures as compared to pastures planted on regularly prepared seedbed for winter grazing.
An. Husb. FE-8
- Miss. A Study to Determine the Relative Value of Different Winter-Grazing Crops for Finishing Weanling Calves. To determine relative value of various crops for production of winter grazing as measured by (1) rate of gain and total beef produced per acre, (2) cost of beef production, and (3) length of grazing period and tendency to winter kill.
An. Husb. FE-10
- Miss. A Study to Determine the Value of Supplements for Improving the Utilization of Low-Quality Roughages. Learn kind of supplementation needed for maximum utilization of low-quality roughages by wintering beef cattle.
An. Husb. FE-13
- Miss. A Study of Rations for Wintering Mature Beef Cows. To determine relative value of several rations for wintering bred beef cows in Mississippi.
An. Husb. BE-3
- Mo. Pasture Improvement: A. Pasture of Cattle; B. Relation of Type of Animal to Rate of Gain; C. Periods of Maximum Response to Different Pastures by Steers; D. The Incidence of Bloat and Methods for its Control. To (1) fatten steers during grazing season, checking health, weight gains, and management practices, for marketing purposes, (2) determine the type of steer which makes the best gains from pasture, (3) determine periods of greatest gain for cattle on various pastures, and (4) determine under what conditions pastures produce a high incidence of bloat, and if simple methods of management can be used to control it.
An. Husb. 154
- Mo. Forage Poisoning Caused by Drought. To (1) develop a quick chemical test to predict if forage would be toxic to farm animals, (2) learn if the toxicity forage declines after ensiling, and (3) study physiological effects of high nitrate intake on farm animals and investigate ways of counteracting the effects.
An. Husb., Field Crop, Vet. Med. 247

- No. The Effect of Nitrate in Feedstuffs on the Performance of Sheep and Cattle. To (1) observe effect of feeding forages, grown under conditions which favor high nitrate accumulation, on the rumen function and general performance of sheep and cattle, and (2) learn if effects observed in (1) can be duplicated by adding nitrate to the normal ration of cattle and sheep.
An. Husb. 251
- Mo. Factors Affecting Gains of Stocker Cattle. To (1) determine feeding value of various farm grown roughages in winter rations, (2) determine value of winter pastures, and (3) develop a management system that will give best returns from wintering and summer grazing periods.
An. Husb. 236
- Mo Ruminant Digestion. To (1) develop surgical, chemical, and bacteriological techniques which can be routinely applied to the study of ruminant digestion, (2) determine effect of food nutrients, antibiotics and other chemicals on rumen flora and fauna, (3) optimum level and source of soluble carbohydrates for maximum cellulose use in sheep, (4) inoculate animals, with a functioning rumen flora, at the time of major ration changes and evaluate the subsequent performance of the animals, and (5) determine effect of inoculating lambs in early life on subsequent performance.
An. Husb., Agr. Chem., Vet. Med. 168
- Mo. Ruminant Digestion: A. Rumen Culture. To (1) set up in laboratory an artificial rumen with conditions simulating those found in natural rumen, (2) study by quantitative chemical analysis the changes that occur in a ration as it is fermented in artificial rumen, (3) study methods of preserving rumen organisms so they will be available for inoculation of artificial rumen, and (4) study effects of these preserved rumen microorganisms on a ruminant.
Agr. Chem., Vet. Med. 152-a
- Nebr Value of Specific Roughages in Rations Containing Equivalent Levels of Known Essential Nutrients for Fattening Cattle. To (1) determine comparative values of alfalfa hay, brome grass hay, and prairie hay as roughages in rations for fattening beef cattle, and (2) compare the value of urea, soybean oil meal, and alfalfa hay as nitrogenous supplements in fattening rations.
An. Husb. 456
- Nev. Beef Production on Irrigated Farms. To learn feasibility of producing beef on irrigated lands not in range or native vegetation.
An. Husb., Agr. Econ. 83

Nev.

The Nutritive Value of Range Forage and Its Relationship to Reproduction and Growth of Range Livestock as Modified by Nutrient Supplementation. To (1) determine the botanical and chemical composition of the diet of range livestock as modified by location, season, climatic conditions and management practices with special reference to nutrient deficiencies, nutrient excesses or toxic materials, (2) determine the effects of various kinds and amounts of seasonal supplementation upon growth, reproduction, blood and body composition during both the period of supplementation and subsequent periods in terms of nutrient requirements under range conditions, (3) study the utilization of range forages by livestock as determined by growth, digestibility, metabolism and body composition studies, and (4) the development of adequate techniques to facilitate the completion of these objectives.

An. Husb., Agron. and Range Mgt., Vet. Sci, Chem. 8-11-34

N. J.

Relationship of Time of Cutting to Digestibility of Hay from Alfalfa and Birdsfoot Trefoil. To determine the digestibility of (1) alfalfa hay cut during the one-tenth, one-half and full bloom stages, and (2) birdsfoot trefoil hay during the one-tenth, one-half and full bloom stages.

An. Husb. 90

N. Mex.

The Effect of Various Food Supplements Upon Roughage Digestion in Ruminants. To determine by digestion trials the digestability of a native range hay as influenced by the addition of various food supplements.

An. Husb. 9

N. C.

Studies on Bloat in Ruminants. Learn normal physiology of eructation. Produce bloat experimentally. Learn chemical and physiological differences between feeds and injesta associated with bloated animals and those associated with normal animals.

An. Ind., Dairy Ind. RM60

N. C.

Ladino Clover-Grass Pastures for Fattening Cattle. To study (1) methods of using Ladino clover-grass pastures to fatten cattle for market, (2) response of steers grazing Ladino clover-grass pastures to graded levels of grain, (3) forage consumption and digestibility by steers on graded levels of grain, (4) effects of various winter treatments on subsequent performance of grazing steers receiving graded levels of grain, and (5) contribution of clover and of grass in Ladino clover-grass pastures.

An. Ind., Agron. P62

N. Dak.

Roughage Utilization by Ruminants. To (1) study, by rumen fistula and digestion trials, value of poor quality roughage for sheep, (2) compare ability of cattle and sheep to use good and poor roughages, (3) study feasibility of altering rumen microflora of sheep by inoculating with rumen contents from cattle, (4) determine why sheep do not consume poor quality roughage as do cattle and if poor quality roughage is force fed, if it would be digested, and (5) find methods of making greater use of roughage common to northern great plains.

An. Husb. 19

Ohio

The In Vitro Digestibility of Cellulose from Various Sources and the Effect of Lignification Thereon. To (1) learn the digestibility (in vitro) of cellulose and cellulose-containing crude fiber fractions isolated from feedstuffs (corn cobs, oat hulls, wheat bran, alfalfa leaves and stems, timothy, and straws), and (2) try to assess effect of lignification of materials on digestibility of cellulose in these materials.

An. Sci. 89

Ohio

Digestion Studies: 7. Factors Affecting the Utilization of Feeds by Ruminants. To (1) determine factors affecting roughage digestion in ruminants, using an artificial rumen technique, (2) determine by in vitro methods factors in non-protein nitrogen utilization by rumen microorganisms, and (3) apply and further determine factors important in rumen function, using cattle experiments directed towards greater efficiency of utilization of low grade roughages.

An. Sci. 1-7

Ohio

Pasture Species for Beef Animals. To answer (1) can Reed canary grass be used by beef animals, (2) how does animal production on reed canary grass compare to production on bluegrass, (3) when improving a pasture on heavy soils of Northeast Ohio should be plowed or left unplowed, and (4) how much production can be expected on areas that cannot be plowed because of stones or other obstacles?

Agron., An. Sci. 2-5

Ohio

Improvement of the Method for Determining the Crude Fiber and Nitrogen-free Extract (N.F.E.) of Feeds. To improve crude fiber method of analysis so that the crude fiber determination will be a measure of the fraction of the feed that is undigestible carbohydrate fraction and the N.F.E. (by difference) is the readily digestible fraction.

An. Sci. 51

Okla.

The Effect of Steroids on Microbial Carbohydrate Utilization. To determine (1) effect of cholesterol, estradiol, stilbestrol, estrone, testosterone, progesterone, vitamin D, and cortisone in respect to stimulation or inhibition of microbial growth and use of glucose, maltose, sucrose, starch, (2) if the micro-organisms under observation are capable of using any of the steroids listed as a sole source of carbon for growth and reproduction, and (3) if the steroids affect extracellular enzyme production.

Bact. 892

Okla.

Improving the Utilization of Low Quality Roughages. To determine (1) value of alfalfa ash in utilization of low-quality roughages, (2) mineral deficiencies of roughages, which are improved by addition of alfalfa ash, (3) effective combinations of inorganic elements for more efficient use of low-quality roughages, and (4) practical supplements to supply nutrient deficiencies of low-quality roughages.

An. Husb., Agr. Chem. 874

- Okla. Relation of Level of Wintering to Production of Feeder and Grass Fat Steers. To (1) determine effect of level of wintering three successive winters upon the performance of long three-year-old steers fattened on grass alone (2) determine effect of level of wintering of two successive winters upon the performance of long two-year-old steers fed corn on grass the second summer grazing season, (3) produce fat two-year-old steers using a maximum of grass, (4) compare two levels of feeding corn on grass to two-year-old steers which have been wintered at a "high" level, and (5) compare the management system of producing two-year-old feeder and slaughter steers.
An. Husb., Agr. Chem. 655
- Oreg. The Development and Application to Feeding Practices of Techniques for Measuring Range Feed Consumption and Quality by Beef Cattle. To (1) develop indicator techniques suitable for the determination of digestibility of mountain flood meadow hays in the wintering ration for beef cattle, (2) apply such techniques to the estimation of intake and digestibility of range forage by grazing beef cattle and (3) study how to efficiently and economically supplement sagebrush range for grazing cattle, based on information obtained under objectives one and two.
An. Husb. 264, (W-34)
- Pa. Utilization of Forage by Beef Cattle. To (1) evaluate methods of utilizing high quality pasture and harvested forage in feeding beef cattle, (2) measure relative cost of beef production under feeding systems in which concentrates are replaced with pasture and harvested forage, and (3) evaluate relative quality of beef produced under various feeding systems used.
Agron., An. Husb. 1245
- Pa. The Nutritive Evaluation of Forages. To (1) determine the digestible dry matter, digestible protein, and digestible energy of forages of particular value in the Northeast, using sheep as the experimental subjects, (2) determine the above constituents on forages produced by the New Hampshire Station for special cooperative studies. Metabolizable energy are also being determined on three of these forages, and (3) compare nutrient values of forages as measured by sheep with those measured by other techniques (cattle, rabbits, chemical analysis, etc.).
An. Nutr. 1263, (NE-24)
- S. C. Factors Affecting Feed Utilization by Ruminants. To learn (1) value of feed supplements to pasture and other roughages, and (2) use of urea and other organic nitrogenous compounds as additives to molasses, and other farm grown carbohydrate feeds.
Dairy Husb., Agr. Chem., An. Husb. 93
- S. C. Dried Citrus Pulp in the Ration of Steers Fed in Dry Lot. To determine (1) effect of citrus pulp on rate and economy of gains, (2) value of citrus pulp as partial replacement for corn (3) effect of citrus pulp in fattening ration on quality of beef produced, and (4) effect of citrus pulp on time needed for blood clotting.
An. Husb. 77

S. Dak.

Nutritive Value of Grasses and Hays of the Northern Great Plains. To obtain data on composition, digestibility, and productive value of pastures and hays. More specifically to (1) determine by feeding trials, digestion, and where necessary, metabolism trials, the nutritive value of grasses cut for hay and stored at shooting stage, seed ripe stage, and mature stage, using hay from different parts of the state representing different soil, weather and grass conditions, (2) store sufficient hay by stacking or other methods that a feeding trial and/or digestion trial can be conducted each year for five years on hay stored one year, two, three four, and five years, to stabilize feed supplies and livestock production by storing feed grown in good feed production years to provide adequate feed in dry years, (3) to formulate a livestock program from the information known and gained in one and two as to digestibility, feeding value, protein, minerals, quality of forage, time of making maximum use of pastures and hays, supplements needed, etc., and (4) to find a simpler method for determining digestibility of growing pasture grass and feeds using steers that will reduce cost, time, labor involved, etc.

An. Husb., Agron., Agr. Chem. 120

S. Dak.

Chemical Analysis of Grass Silage with Different Methods of Storage. To (1) analyze newly ensiled samples for carotene, protein, ash, crude fiber, ether extract, nitrogen-free extract and moisture, and compare with analysis of samples taken at feeding time from silos, and (2) make moisture determinations on silage as it is weighed out to determine bulk losses at time of feeding.

Biochem. 237-D, (NC-23)

Tex.

An Evaluation of Animal and Vegetable Protein Feeds with Respect to Chemical Composition and Feeding Value. To (1) determine cystine content of farm feeds and human foods, (2) develop method for stabilization of tyrosine during hydrolysis of food materials for amino acid assay, (3) determine tyrosine content of farm feeds and human foods, and (4) improve microbiological methods for determination of amino acids and to adapt these methods to rapid analysis of the large number of samples necessary in feed control work.

Biochem and Nutr., An. Husb. 521

Utah

Nutritional Deficiencies in Range Forage and the Supplementary Feeding of Range Livestock. To (1) determine the botanical species and chemical composition of the diet of range livestock with special reference to deficient or excessive nutrients and toxic materials, (2) note effect on calf and lamb crop and other production factors after supplementing deficient diets or instituting preventive or corrective measures for diets with excessive or toxic materials which are consumed by range livestock, (3) develop techniques of handling range livestock for detailed experimental research, and (4) study methods of determining digestibility and metabolizable energy content of various species and mixtures consumed by cattle on ranges. Sheep may be used for comparisons.

An. Husb., Range Mgt. 421, (W-34)

Va

The Isolation, Propagation, and Nutrition Requirements of Cellulose-Decomposing Bacteria Found in the Rumen of Cattle That are Consuming High-Roughage Feeds. To (1) isolate cellulose-decomposing bacteria from rumen of cattle and design methods for propagation in quantity, and (2) investigate nutritional requirements of cellulose-decomposing bacteria as to carbon, N. minerals, and unidentified growth factors.

Biochem. and Nutr., An. Husb., Dairy Husb., Biol. 8438

Wash.

The Effect of Various Constituents on the Utilization of Wheat Straw by Pregnant Beef Heifers. To (1) compare effects of feeding wheat straw and alfalfa hay on the performance and well being of pregnant heifers, (2) increase use of wheat straw by a increasing available N, b attempting to balance mineral needs of the rumen microflora and the host heifer. (3) a determine if pregnant heifers, consuming primarily wheat straw will obtain sufficient vitamin A to prevent deficiency syndromes, b determine extent of vitamin A deficiency, if any, and (4) determine if small amounts of dehydrated alfalfa will stimulate the consumption and use of wheat straw.

An. Husb. 1242

W. Va.

Measuring the Nutritive Value of Forage Crops. Development of chemical and/or biological techniques for the determination of the nutritive value of forage crops.

Agr. Biochem., Agron. and Genetics, An. Husb. 70

Wyo.

Nutritional Evaluation of Wyoming Feeds. To determine coefficients of digestibility of the protein in high quality native hay produced in Wyoming.

An. Prod., Chem. 566

Wyo.

Range Livestock Nutrition. To (1) determine the digestibility of harvested forages and/or supplements used for wintering range livestock, (2) determine chemical composition and nutritive value of range forage as related to performance of cattle and sheep, (3) develop more satisfactory methods of range nutrition research, and (4) compile and review existing data on range forage plants, poisonous plants and toxic materials in Wyoming forages.

An. Prod., Agr. Res. Chem., Agron. 613, (W-34)

B. Concentrates

- Colo. Varying Amounts of Concentrates and Roughages in Cattle Fattening Rations. To determine effect of varying proportion of concentrates to roughages fed cattle on (1) feed use, measured by weight gain, feed eaten, and digestion trials, and (2) market outcome, measured by live and carcass grades, yield, shrink, degree of finish and economy of production.
An. Ind. 152
- Idaho Concentrate-To-Hay Ratios for Growing and Fattening Cattle. To establish (1) optimum economical ratio of concentrate to hay for growth and fattening, and (2) minimum protein requirements for the various ratios of concentrate to hay.
An. Husb. 52
- Ill. Supplementing Wintering Rations for Steer Calves. To study (1) grass silage, corn silage, and hay as a wintering ration for steer calves, and (2) combinations of soybean meal, corn, and feeding fat as a supplement for these roughages.
An. Sci. 40-324
- Miss. A Study of Different Methods of Finishing Steers to be Marketed in Late Summer and Fall. To determine relative value of various methods of finishing steers on feeds available in Mississippi as measured by (1) rate of gain and length of feeding period, and (2) net returns per steer.
An. Husb. FE-2
- Miss. A Study to Determine the Value of Corn and Blackstrap Molasses in the Rations of Beef Cattle and the Effect of These Carbohydrates on the Microbial Flora of the Rumen. To (1) compare corn and molasses as sources of readily available carbohydrates for beef cattle, and (2) determine if any differences can be observed in microbial flora of rumen, and digestibility of rations.
An. Husb. FE-6
- Miss. A Study to Determine the Protein Requirements of Fattening Yearling Cattle. To learn amount of protein supplement needed by fattening yearling cattle fed on a basal ration of (1) oats and Johnson grass hay in dry lot, and (2) corn and Johnson grass hay in dry lot.
An. Husb. FE-12
- Miss. A Study of Levels of Protein and Energy Intake and Their Effect Upon Productive Efficiency of Beef Cattle. Learn protein and nutritional level most nearly optimum for highest production in beef cattle.
An. Husb. BE-5
- Nebr. Methods of Feeding Cattle From the Standpoint of Experimental Design. To determine and evaluate differences in response of cattle to hand-feeding versus self-feeding in groups and individually.
An. Husb. 440

Nebr.

The Use and Value of Beef Tallow in Cattle Fattening Rations. To (1) determine effect of adding beef tallow to cattle fattening ration, (2) determine quantitative effect of edible and inedible beef tallow in a cattle fattening ration, and (3) compare effect of edible and inedible beef tallow in cattle fattening ration.

An. Husb., Biochem. 447

N. Mex.

Wintering Stocker Calves. To (1) compare rations containing moderate and liberal amounts of T.D.N. for stocker calves in regard to: rate of gain made by calves, cost of feed for wintering, cost of additional gain produced by heavier ration, and effect on gains made on range the following summer; and (2) determine effect of weight of stocker calves on: rate of gain, amount of feed needed for wintering, and returns for feed used.

An. Husb. 47

Ohio

(Wooster)

Relationship Between Various Feeds or Nutrients and the Protein Requirements of Fattening Cattle. To (1) re-evaluate protein needs of fattening cattle, (2) determine effect of molasses, trace minerals, and other factors on utilization of protein and energy, and (3) relate objectives 1 and 2 to type and quality of roughage fed.

An. Sci. 93

Okla.

A Study of Various Supplements or Substitutes for Corn and Cottonseed Meal for Fattening Beef Calves: Study of Various Substitutes for Corn and Cottonseed Cake for Fattening Steer Calves. To (1) determine optimum levels of protein for a steer fattening ration, (2) determine value of urea as a substitute for cottonseed meal in steer fattening ration, (3) compare value of cowpeas (Chinese Red variety) and cottonseed meal when fed at same level of crude protein in steer fattening ration, (4) compare alfalfa hay and cottonseed meal as source of protein when each is fed to fattening beef calves, (5) study effect of varying amount of protein supplement according to age of steer and time on feed, as compared to uniform distribution of same average amount over entire feeding period, (6) determine value of addition of trace minerals to steer fattening rations, (7) compare feeding value of new varieties of grain sorghum to corn for fattening steer calves, (8) study value of alfalfa hay in ration of grain sorghums, cottonseed meal and sorghum silage, and (9) determine value of dehydrated alfalfa meal pellets as partial replacement for cottonseed meal in fattening rations for steer calves.

An. Husb., Agr. Chem. 394

Okla.

New Supplements in Fattening Rations for Yearling Steers. To (1) evaluate certain new beef cattle supplements relative to standard oil meal when fed on an equal protein basis and used to supplement feeds common to Oklahoma, (2) develop improved beef cattle supplement of a simple mixture of feeds known to contain nutrients beneficial to rumen bacteria, and (3) study relative value of sorghum silage and prairie hay in limited-grain rations for fattening yearling steers.

An. Husb., Agr. Chem. 819

Okla.

Effect of Various Concentrate-To-Roughage Ratios on the Feedlot Performance of Steers and Heifers. To (1) study effect of certain concentrate-to-roughage ratios for self-feeding fattening yearling steers and heifers to a. rate of gain, b. efficiency of feed utilization and economy of gain, c. necessary time on feed to reach desired slaughter grade, and d. quality of carcass produced; and (2) compare performance of steers versus heifers within each level of concentrate to roughage.

An. Husb. 893

Okla.

Protein and Non-Protein Nitrogen Utilization by Ruminants. To determine (1) effect of different levels of carbohydrate in ration on use of protein, and other feed nutrients, by ruminants, (2) under practical feed-lot conditions, relative value of urea and how it may be used to best advantage in supplementing protein of rations for growing and fattening lambs, (3) value of adding small amounts of methionine to rations containing urea and rations containing natural feed proteins, (4) compare value of ammoniated cane molasses as partial replacement for cottonseed meal for wintering stocker cattle on native grass, (5) compare two methods of feeding ammoniated cane molasses to beef cattle on dry grass--hand fed in bunks versus sprayed on dead grass, (6) determine, by use of digestion trial data, optimum level of furafeed for steer calves and comparative value of furafeed and cottonseed meal when supplying equal amounts of N in rations for steer calves, and (7) determine if high levels of fura-feed are toxic to sheep.

An. Husb., Agr. Chem. 709

S. C.

The Economy and Rate of Gain and the Quality of Meat Produced by Steers Fattened in Dry Lot and on Winter Forage. To determine (1) relative cost of fattening steers in dry lot and on pasture with supplementary grain, (2) relative value of such home-grown feeds as corn, oats, and cottonseed meal for steers fed on forage, and (3) compare quality of beef produced by steers fattened in dry lot and those fed on pasture.

An. Husb., Agron., Agr. Econ. 72

Va.

The Effect of Various Protein and Non-Protein Nitrogen Sources on Protein Assimilation by Rumen Microorganisms. To (1) determine if non-protein N of types used in cattle feeds suppresses decomposition of feed protein by rumen microorganisms, and (2) compare proteins of forage crop stems and leaves, seed proteins, and animal proteins of high biological values of N sources in protein synthesis by rumen microorganisms.

Biochem., An. Husb., Dairy Husb., Biol. 8439

W. Va.

Methods to Increase Non-Protein Nitrogen Utilization by Ruminants. To evaluate a variety of non-protein nitrogenous compounds which may be useful as replacements for protein concentrates in ruminant rations containing a high proportion of roughage.

An. Husb., Biochem. 69

C. Feed Adjuvants

- Calif. The Effect of Hormones on the Growth and Fattening of Meat
(Davis) Animals. To learn (1) types of hormones best suited for increasing growth or carcass quality, (2) most effective dose, (3) influence of age, sex, and dietary conditions on effect of treatment, and (4) mechanism by which hormones influence metabolic activities.
 An. Husb. 1662
- Colo. The Effect of Hormones, Drugs and Similar Substances on Nutrition of Livestock. To (1) determine the effect of these substances when fed as part of the ration and when administered parenterally on feedlots responses and carcass grade and yield, (2) determine by individual digestion trials the influence of these substances on the digestibility of feeds and the efficiency of nutrient utilization, (3) determine by chemical and/or biological methods the natural and added concentrations feed stuffs of the substances enumerated above, (4) determine by chemical and biological methods the residues of these substances, if any, deposited in organs and tissues, and (5) determine by gross and microscopic examination of organs and tissues any effect ascribable to treatment with these substances.
 An. and Dairy Ind. 182
- Miss. A Study of the Use of Diethylstilbestrol in Fattening Steers and Heifers. To learn value of above as feed supplement for fattening cattle and heifers under Mississippi conditions.
 An. Husb. FE-9
- Ohio The Influence of Sex Hormones Upon Growth Rate, Fattening, and Carcass Quality of Feeder Calves. To (1) compare growth rate, fattening, and carcass quality of steer and bull calves, (2) determine influence of diethylstilbestrol implants in steers and bulls upon performance in feed lot and upon quality of carcass, and (3) study excretion rate and carcass retention of stilbestrol after subcutaneous implantation.
 An. Sci. 29-1, (NC-1)
- Tenn. Studies of Endocrine Relationships in Farm Animals: C. Beef Cattle. To study (1) effects of steroid hormones on rate of growth, feed efficiency and carcass characteristics in beef cattle, and (2) role of endocrine system in reproduction and growth in beef cattle.
 An. Husb., Vet. Sci. 42-C

Wash.

The Effects of Animal Fat, Antibiotics and Stilbestrol Administered to Fattening Steers Consuming Good and Poor Quality Roughage. To (1) determine the influence of high levels of animal fats in ruminants ration on: a. digestibility and efficiency of utilization of the fat and associated dietary constituents, b. vitamin A stores in the liver, c. characteristics of the deposited fat, d. the retention of yellow pigments in the depot fat, and e. total blood lipids; (2) determine the influence of dietary stilbestrol and/or aureomycin on feed efficiency, digestibility of high and low fat and good and poor quality roughage diets; (3) determine the influence of high levels of dietary fat on utilization of pasture; (4) determine the influence of site of introduction of fat and aureomycin deposition on digestibility of feed nutrients; and (5) determine the effects of animal fat, aureomycin and stilbestrol on carcass characteristics.

An. Husb. 1217

Wis.

Market Value and Nutritional Quality of the Meat from Livestock Receiving Stilbestrol. The objectives of these experiments are to investigate (1) the effect of diethylstilbestrol added to various rations on carcass quality, weight gains and feed efficiency of beef cattle, (2) effect of feeding stilbestrol to beef cattle on the nutritive value of the carcass, and (3) effect of ingested stilbestrol on the concentrations and distribution of fat, protein, water, vitamins and estrogenic activity in the bodies of beef cattle.

An. Husb., Biochem., Genetics 967

Wyo.

The Effect of Stilbestrol on the Performance and Carcasses of Steers. To (1) study the effect of feeding stilbestrol to steers on the rate of gain and feed efficiency, and (2) study the effect of feeding stilbestrol on the yield, carcass grade, shrink in storage, quality and composition of the carcass.

An. Prod., Vet. Sci., Agr. Res. Chem., Home Econ. 599

D. Minerals

Ariz.

Nutritional Studies on Arizona Range Plants and Cattle. To determine (1) cobalt, manganese, copper and molybdenum content of major forage plant species eaten by range cattle, and (2) amount of these minerals occurring in blood and liver of range animals--with attempts to correlate a deficiency or toxicity condition with a change in composition of these minerals.

An. Husb. 183

Calif.
(Davis)

Studies of Mineral Metabolism in Animals: I, Calcium-Phosphate Relations; II, Iodine Metabolism in Cattle and Sheep; III, Mineral Deficiencies on Range Lands--Calcium, Manganese, Cobalt, Sulfur, and Other Minerals. To (1) study the effect of a low phosphorus diet on reproduction, (2) continue search for a goitrogenic substance in the water from Hat Creek, and (3) study nutritional conditions in various parts of the State where livestock production cannot be maintained at a maximum level on native vegetation alone.

An. Husb. 938

- Fla. Mineral Requirements of Cattle. To investigate role of mineral elements in nutrition of cattle, with particular emphasis on interrelationships of elements in development of nutritional abnormalities observed in Florida.
An. Husb. and Nutr., Dairy Sci. 133
- Fla. Investigation of Mineral Nutrition Problems of Livestock Through the Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral interrelationships that occur in farm livestock, using suitable laboratory animals.
An. Husb. and Nutr. 346
- Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
An. Husb. and Nutr. 566
- Miss. Survey of the Coastal Region of Mississippi to Locate Possible Cobalt and Other Mineral Deficient Areas. To study cattle and analyze plants from the coastal area of Mississippi in order to locate cobalt deficient areas if they exist, and study other essential mineral elements.
An. Husb. BE-1
- Mo. The Mineral Nutrition of Ruminants. To (1) reevaluate qualitative and quantitative mineral requirements of ruminants, (2) learn mineral element(s) or combination of elements in alfalfa ash which is (are) effective in stimulating appetite and improving performance of cattle and sheep fed low quality roughage, and (3) obtain more data on role of mineral imbalances in etiology of "stiff lamb" disease, urinary calculi, and tetany.
An. Husb. 248
- Mont. The Calcium, Phosphorus, Magnesium, and Vitamin A Content of the Blood of Hereford Cows and Their Calves at the U.S. Range Livestock Experiment Station. To correlate the Ca, P, Mg, and vitamin A content of blood of cows and calves on range with analyses of soil and range plants from pastures on which cattle are grazed, with the rates of growth and reproduction of the cows, and with development of urinary calculi on calves.
Vet. Res. Lab. 52
- Mont. Mineral Nutrition of Cattle and Sheep. To (1) compare winter performance and following summer performance on pasture of beef calves wintered on low-phosphorus grass hay with hay ad libitum and varying amounts of phosphorus and trace minerals added, and (2) study effect of phosphorus nutrition on blood carotene and vitamin A levels.
An. Ind. and Range Mgt., Vet. Res. Lab. 102

- Okla. The Availability to Ruminant Animals of Phosphorus in Various Phosphorus Supplements. To learn (1) relationship between P intake and gain in weight, bone calcification, inorganic P level of blood plasma, true digestibility of P and balance of P in steer calves, and (2) availability to steer calves of P contained in certain mineral supplements and feeds.
An. Husb., Chem. 330
- Oreg. The Role of Minor Elements in Animal Nutrition. To determine the distribution of 'trace' or minor elements of importance in animal nutrition and livestock disorders. To apply this information to problems in the fields of nutrition and livestock production.
Dairy Husb., Chem., An. Husb. 154
- Tenn. Mineral Metabolism in Animals: I, Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals. To (1) determine the normal distribution of these mineral isotopes administered by the various routes to cattle, swine and sheep, and to study thereby in detail the normal absorption, utilization and skeletal metabolism of selected minerals in these animals; (2) measure endogenous losses of calcium and phosphorus and from these values determine maintenance requirements in the various species as a function of age; (3) determine the biological availability of calcium and phosphorus from the common dietary sources of ruminants, and simple stomached animals, and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc., upon the availability; and (4) apply radioisotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.
An. Husb., Vet. Sci. 52, Coop. AEC
- Tenn. Mineral Metabolism in Animals: II, Interrelationships of Calcium and Phosphorus with Vitamins, Minerals, Hormones, and Other Factors. To (1) investigate and separate effect of metabolism of calcium and P, certain important factors which are known to influence their behavior in the animal body, and (2) study such elements and substances as are known to induce abnormal bone metabolism that are important for clarification of normal mechanisms and to aid in explanation of toxicological properties.
An. Husb., Vet. Sci. 53, Coop. AEC
- Wis. Mineral Metabolism and Mineral Requirements of Animals. To study (1) the effect of mineral supplements of various kinds of animals fed low lime rations, (2) the role of inorganic compounds containing such elements as iron, copper, nickel, cobalt, zinc, and manganese, and (3) factors responsible for nutritional anemia and effect of various inorganic elements and compounds in correcting such anemias. Fundamental investigations on the phenomena of hemoglobin building on the body will be continued.
Biochem., Dairy Husb., An. Husb. 8
- Iyo. The Selenium Problem as Related to Poisoning in Animals. To (1) study effect of selenium poisoning on the metabolism of the phosphorylated compound in vivo by the use of radioactive phosphorus, (2) study effect of selenium poisoning on sulfur, (3) study metabolism of selenium in animals fed with plants containing selenium in organic and inorganic form, and (4) convert elemental selenium to soluble selenium by ruminants.
Agr. Res. Chem. 491
- Iyo. Selenium in Vegetation, Water, and Animal Tissues. To (1) have a geological map of principal seleniferous areas of the State, (2) correlate quality of stock water with geological outcrops, (3) attempt to explain plant response to different forms of soil selenium, and (4) determine what constitutes a selenium value of clinical significance in livestock injury from ingestion of seleniferous vegetation.
Agr. Res. Chem. 493

- Ala. The Tocopherol Content of Feeds and Forages and the Significance of Vitamin E in the Nutrition of Farm Animals. To (1) determine concentrations of total tocopherol, alpha tocopherol, and unsaturated fatty acids in representative feeds, feeding stuffs, and forages, as influenced by stage of maturity, environmental conditions and processing or treatment and storage, (2) survey blood serum levels of tocopherol, unsaturated fatty acids, and vitamin A in cattle and sheep under various feeding practices, in various diseases, (3) determine influence of diet and dietary factors on development and cure of nutritional muscular dystrophy in rabbits and of "white muscle disease" in cattle, (4) ascertain cause and nature of lightened, slate-grey color of muscle in "white muscle disease," and analogous condition in rats and rabbits, and (5) determine if vitamin E is important in swine nutrition.
An. Husb., 323

- Colo. The Utilization of Carotene in the Animal Body. The procedure involves preliminary studies on rabbits and chickens to determine their ability to store vitamin A and carotene, a study of body stores as related to ration constituents determination of the cause of variation in the mobilization and utilization of vitamin A and carotene in the animal body, isolation and identification of specific substances found to be a factor in the carotene-vitamin A picture, and a study of the effect of physiological processes taking place in the digestive tract of ruminants, swine, and poultry on carotene, vitamin A, and such extrinsic factors as have been found to exist.
Chem. 87

- Colo. Vitamin A Nutrition of Beef Cattle in Colorado: III. Vitamin A Nutrition in Reproduction and Lactation of Beef Cattle. To study (1) need of vitamin A in preparation of heifers and bulls for reproduction, (2) vitamin A nutrition in gestation, parturition, and lactation of cows, and (3) digestibility of carotenoids by cattle.
An. Ind. 24-III

- Colo. Vitamin A Nutrition of Beef Cattle in Colorado: IV. Vitamin A Nutrition in Relation to Other Nutrients in the Growth and Development of Young Beef Cattle. To study (1) vitamin A nutrition in relation to other nutrients in growth and development of young beef cattle in relation to protein level, and to mineral levels and balance, and (2) vitamin nutrition in relation to other nutrients in gestation, parturition, and lactation in beef cows.
An. Ind. 24-IV

Colo.

A Rachitic Condition Shown by Heavily Fed Cattle Receiving Adequate Calcium, Phosphorus, and Vitamin D. To determine (1) cause of a rachitic condition shown by many high quality cattle when fed heavily on nonrachitogenic rations, and (2) control or elimination of such development.

An. Ind. 25

N Mex.

The Relation of Forage Carotene and Phosphorus to the Blood Plasma Carotene, Vitamin A, and Inorganic Phosphorus of Range Cows. To (1) develop monthly and yearly pattern of blood carotene, vitamin A, and inorganic P of breeding cows in important grazing areas and vegetative types, (2) determine levels of carotene, vitamin A, and inorganic P in the blood of range cows (3) correlate carotene and P content of the forage consumed with the blood carotene, and inorganic P analyses, and (4) compare results of these blood tests found during winter and spring with present accepted standards, and also with patterns found for southern New Mexico.

An. Husb. 36

Ohio

The Effect of Adsorbents and Minerals on the Determination of Riboflavin and Other B-Complex Vitamins and on Their Availability to Animals. To (1) determine effect of adsorbents and minerals on present accepted methods of assaying for riboflavin and other B-complex vitamins, and (2) study effect of adsorbents and other B-complex vitamins to animals.

An. Sci. 48

Okla.

The Correlation of Vitamin A Liver Stores with Plasma Vitamin A in Cattle. To (1) study storage of carotene and vitamin A and the use of such stores by beef cows during maintenance, reproduction and lactation; a. study correlation of liver and plasma vitamin A levels in cows during reproduction and lactation, b. correlate liver stores and plasma levels and vitamin A and carotene with the amount in the diet and milk, c. study effect of body reserves of vitamin A and carotene of cow on the liver and plasma levels of the calf at birth and during the nursing period, and (2) study effect of level of carotene intake and other dietary conditions on the absorption and utilization of carotene by steers.

An. Husb., Chem. 747

Wis.

The Effect of Vitamins and Other Organic Nutrients on the Growth, Milk Production and Reproduction of Animals. To determine factors concerned with the adequate nutrition of farm animals as related to Wisconsin conditions.

Agr. Chem., An. Husb. 10

Carcass Evaluation

Tenn.

Type and Breed as Factors Involving Beef Carcass Characteristics and Consumer Acceptance. To (1) relate carcass characteristics of beef and dairy animals varying greatly in confirmation to consumer preferences and acceptance, (2) compare value of retail cuts from experimental animals as evaluated at the retail level with the characteristics of carcasses from which they came as evaluated in detail at the wholesale level, (3) use the information in objectives 1 and 2 for developing improved standards for evaluating carcasses at the wholesale level and for evaluating conformation in beef breeding stock, and (4) determine the necessary inputs per pound of edible meat produced by animals varying greatly in confirmation.

An. Husb., Vet. Sci., Agr. Econ. and Rural Sociol. 70,
Coop. ARS

Tex.

Characterization of Carcass Quality and Eating Quality of Individual Animals. To (1) determine carcass characteristics of individual animals of known history and breeding as part of effort to develop beef cattle yielding meat of superior market qualities, and (2) characterize eating quality of meat from individual animals of known history as part of effort to develop beef cattle yielding meat of superior eating qualities.

An. Husb., Rural Home Res. 941, (S-10)

Va.

The Effect of Different Methods of Feeding on the Patterns of Growth and Carcass Composition of Cattle and the Evaluation of Techniques and the Development of New Techniques for Studing Carcass Composition. To learn carcass composition by dissection and chemical analysis of cattle on different methods of feeding at various ages and weights. Evaluate and develop techniques for use in live animal indicative of carcass composition--live animal probe as a measure of fatness, body water in vivo and its relationship to carcass composition.

An. Husb. 8456

REGIONAL PROJECTS

NC-1

Improvement of Beef Cattle Through Breeding Methods. To (1) determine the characters important in beef production and their relative value, (2) develop methods of measurement of important characters and determine their heritability values, (3) determine the relationship of performance characters, such as body size, conformation, rate of gain, and efficiency of gain, to net value, (4) determine the effectiveness of selection, inbreeding, cross-breeding, line-crossing and out-breeding -- and combinations of these -- as a means of producing more productive beef cattle, (5) determine the productiveness of existing stocks of beef cattle and their adaptability in various areas under different systems of management, (6) determine the mode of inheritance of defects, lethals, and semi-lethals, and methods of controlling same, and (7) develop practical procedures which can be used to breed beef cattle capable of high production efficiency and superior carcass qualities.

Cooperating stations: Federal-grant projects - Ill., Iowa, Kans., Mich., Mo., Nebr., Ohio, Okla., S. Dak., and Wis.

NC-25

Factors Affecting the Utilization of Feed by Ruminants. To improve the utilization of roughages by ruminants emphasis upon the utilization of the carbohydrate fraction.

Cooperating stations: Federal-grant projects - Ill., Kans., Mich., Minn., Mo., Nebr., and Ohio

NC-27

Causes and Control of Bloat in Ruminants. To (1) determine the physical and chemical characteristics of alfalfa and Ladino clover and fattening rations associated with bloat, (2) determine the physical and chemical characteristics of rumen ingesta from normal and bloated animals, (3) study the physiologic responses of ruminants to bloat-producing feeds, chemicals and procedures, and (4) develop and elucidate measures for the control of bloat.

Cooperating stations: Federal-grant projects - Iowa, Mich., and Minn.

Non-Federal - S. Dak.

S-10

The Improvement of Beef Cattle for the Southern Region Through Breeding Methods. To (1) develop breeding methods, selection criteria and procedures which will result in beef cattle capable of higher productive efficiency and superior market qualities of product, (2) develop beef cattle with higher reproductive efficiency, greater longevity and other aspects of lifetime productive efficiency, (3) develop beef cattle especially adapted to conditions in various environments of the Region, (4) explore the usefulness of systems of breeding, as: a. Inbreeding, b. Crossbreeding, c. Outbreeding, d. Combinations of these to accomplish Objectives one, two, and three, and (5) study productiveness of existing or introduced stocks of beef cattle.

Cooperating stations: Federal-grant projects - Ala., Ark., Ga., Ky., La., Md., Miss., N. C., S. C., Tenn., Tex., and Va.

Non-Federal - Fla.

W-1

The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) develop inbred lines of beef cattle that will be useful in the improvement of such characters as rate of gain, economy of gain, carcass quality, fertility, and longevity, (2) develop effective breeding techniques for improving the productiveness of beef cattle, and (3) investigate the productiveness of existing lines of beef cattle.

Cooperating stations: Federal-grant projects - Ariz., Calif., Colo., Hawaii, Idaho, Mont., Nev., N. Mex., Oreg., Utah, Wash., and Wyo.

W-24

Range Livestock Nutrition. To determine the quantitative and qualitative nutritive value of range forage consumed in terms of chemical analysis, botanical classification, soil, site, stage of maturity, season, drouth, and digestibility relating these factors to reproductive performance, growth and market value of range cattle and sheep.

Cooperating stations: Federal-grant projects - Calif., Colo., Idaho, Mont., Nev., N. Mex., Oreg., Utah, and Wyo.

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BEEF CATTLE

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

BEEF CATTLE

Breeding

- Ala. The Improvement of the Beef Cattle of Alabama Through Breeding Methods. To (1) investigate principles of breeding beef cattle that can be used in production of milk-fat calves, (2) determine how rapidly the performance of native cattle of this area can be improved by use of purebred sire program, (3) determine amount of improvement in performance that can be made in establishing beef breeds by selection, with attention only on performance characters, (4) study importance of heterosis in a grading up program in production of milk-fat calves, and (5) study value of Brahman breeding in rotation sires program, using native cattle as foundation stock.
An. Husb. 525 (S-10), coop. ARS
- Ariz. Progeny Testing of Hereford Sires. To investigate productiveness of different Hereford sires as reflected in growth capacity of their progeny and to develop inbred lines that will be useful in improvement of this character.
An. Husb. 279 (W-1), coop. ARS
- Ariz. Investigation of an Achondroplasia-Like Condition in Hereford Cattle. To determine cause of a congenital deformity in Hereford cattle characterized by short broad head; protrusion of cranium; undershot jaw; abnormally short neck; undersized, compact, and lowset body; enlargement of abdominal region; labored respiration; and incoordinated gait.
An. Husb., An. Path. 282, coop. ARS
- Ark. The Determination of Adequate Records-of-Performance Tests for Beef Cattle. To develop practical but adequate methods for evaluating the breeding worth of beef sires and dams.
An. Ind. and Vet. Sci. 170 (S-10), coop. ARS
- Calif. Qualitative and Quantitative Inheritance in Animals. To study (1) inheritance of differences in growth and conformation and relate this study to carcass yield and dressing percent, (2) effect of genetic and environmental factors on milk and butterfat yield in dairy cattle, (3) inheritance of wool characteristics, (4) resistance and susceptibility to parasites and disease, (5) effects of inbreeding upon size, vigor, fecundity, production, and performance, (6) gene frequencies related to specific gene affects in various breeds, and (7) relation between gene and character.
An. Husb. 939

- Calif. Genetic Control of Hereditary Deficiencies in Beef Cattle with Special Emphasis on Dwarfism. To refine methods used for differentiating dwarf-carrier and dwarf-free mature horned Hereford bulls and lower the age at which the two genotypes can be recognized; and identify dwarf-carrier and dwarf-free genotypes in horned Hereford cows.
An. Husb., Vet. Sci. 1451 (W-1), coop. ARS
- Colo. A Study of Selection, Inbreeding, and the Crossing of Inbred Lines within the Hereford Breeds. To (1) study effect of intensive inbreeding of various traits in beef cattle, (2) study effect of crossing inbred lines and determine how inbred lines may best be used in producing maximum amount of hybrid vigor, and to provide information on the nature of heterosis in beef cattle, (3) study heritabilities of various traits of economic importance and genetic correlations between these traits in order that more effective selection procedures may be developed, and (4) obtain the following additional information: a. What effect does inbreeding have on the rate of blood antigen loss in Hereford cattle? b. To what extent can the antigen picture be used as an index of genetic diversity between inbred lines? c. The use of inbred lines in providing test material for various means of detecting dwarfism in heterozygous condition of Hereford cattle. d. What techniques are most useful in performance testing of beef bulls? e. Study of endocrine pattern of performance tested cattle as revealed by studies of the pituitaries, thyroids, and adrenals.
An. and Dairy Ind. 26 (W-1), coop. ARS
- Ga. The Relative Productive Value of Various Crossbreeding Systems for Use with Livestock. To learn (1) productive value of crosses and rotational breeding systems, (2) how single and double crosses compare, and comparison with a random-bred population, (3) comparison of 2, 3, and 4 lines or populations used in a rotational program, with single and double crosses, and with a random-bred population, (4) how many different populations should be used in a rotational program to get maximum economic performance, and (5) how performance of a rotation can be predicted from lines performance or single cross performance. Mice used as test animal.
An. Husb. 91
- Hawaii The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) develop inbred lines of beef cattle that are useful in improvement of characters such as rate of gain, economy of gain, carcass quality, fertility and longevity, (2) develop effective breeding techniques for improving productiveness of beef cattle, and (3) investigate productiveness of existing lines of cattle.
An. Husb. 268 (W-1)

Idaho

The Improvement of Beef Cattle Through the Application of Breeding Methods: (1) Linebreeding within the Hereford and Shorthorn Breeds; (2) By Testing Linebred Sires within the Various Lines which will be Developed. To develop lines of beef cattle that will result in improvement in such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality.

An. Husb. 8 (W-1), coop. ARS

Ill.

Improving Beef Cattle Through Breeding and Selection.

(1) Develop strains having exceptional ability to grow or fatten on pasture and roughages. (2) Maintain control line without selection under same conditions so as to measure progress and make heritability estimates. (3) Study relationship of various production traits of beef cattle.

An. Sci. 20-372 (NC-1)

Ill.

Effects of Intensity of Selection Under Different Mating Systems. To determine how different intensities of selection affect degree of heterozygosity within populations inbred at different rates. Chickens used as test animal.

An. Sci. 20-380

Iowa

Improvement of Beef Cattle Through Breeding Methods.

To establish inbred lines of Aberdeen Angus, Hereford, and Shorthorn cattle; develop methods of selection for improving lines, and determine possible intensity of inbreeding.

An. Husb. 1055 (NC-1), coop. ARS

Kans.

Development of Superior Lines of Shorthorn Cattle. To

(1) develop superior line of Shorthorns, and maintain detailed record of its progressive development, (2) determine practicability of inbreeding for establishing superior line when herd consists of less than 40 females of breeding age, (3) develop tested procedure and other techniques for evaluation of breeding animals, and (4) collect data on inheritance of physical characteristics of Shorthorn cattle.

An. Husb. 286 (NC-1)

Ky.

A Performance and Progeny Testing Program for Bulls of the Beef Breeds. To (1) use weaning weights, rate of gain, efficiency of gain, and conformation of beef bulls in developing index for predicting their value in breeding herd, (2) use experimental results and experience of participants as means of calling attention of beef breeders to variation in performance of purebred bulls of similar appearance both on feed and in breeding pen, and (3) breed relatively good and relatively poor bulls to uniform groups of cows to test heritability of rate and efficiency of gain in feeder calves.

An. Ind. 72 (S-10)

- La. Comparisons of Various Crossbred and High Grade Cattle Under Gulf Coast Conditions with Respect to Rate of Growth on Pasture, Fattening Ability, and Meat Quality of Steers. To (1) develop types of beef cattle suited to conditions along the Gulf Coast, (2) determine efficiency of various breeds and crosses for economical beef production under Louisiana conditions, and (3) accumulate data which, when interpreted, will be of use to livestock breeders.
An. Ind. 605 (S-10).

- Maine Problems Related to the More Efficient Production of Beef Cattle in Maine. To improve efficiency of beef cattle production by (1) breeding methods, including (a) determination of average daily gain from weaning to 12 months of age, (b) determination of efficiency of feed use (feed consumed per 100 lbs. gain), and (c) study of breeding systems, using records of performance in (a) and (b); and (2) feeding methods, including (a) study of value of rations made of feeds readily available in Maine, and (b) determination of most efficient procedure in handling feeds.
An. Ind. 24

- Md. A Study of the Productiveness of Purebred Beef Cattle in Maryland. To (1) study productiveness of beef cattle including rate and economy of gain, market type, carcass quality, fertility, longevity, etc., (2) compare selection criteria with actual performance, (3) evaluate breeding techniques under varying conditions in purebred herds, and (4) attempt to produce beef cattle with superior productive capacities by linebreeding and selection.
An. Husb. C-14 (S-10)

- Md. Effect of Early Weaning on the Duration of Maternal Influences in Beef Calves. To (1) attempt to develop a new technique for an earlier evaluation of feed lot performance, progeny testing and genetic evaluation of beef animals, (2) develop sound feeding and management practices for early weaned calves, and (3) evaluate calves' genetic ability to thrive under new systems of care.
An. Husb. C-14-a (S-10)

- Md. Type Classification as an Aid in Selection of Beef Breeding Cattle. To determine value of type classification in beef cattle, i. e., heritability of beef type and production.
An. Husb. C-14-b (S-10)

- Md. Group Versus Individual Feeding of Weaned Beef Calves.
To (1) evaluate accuracy of group versus individually fed calves as technique in testing of sire-progeny groups, (2) study possibility of forecasting productiveness of beef calves by using single or combined measurements taken on live animals, (3) study value of scores taken on live animals in relation to forecasting their performance, (4) compare measurements and scores in order to search for objective methods of determining scores, and (5) study absolute and relative changes in measurements and scores from one age to another.
An. Husb. C-14-d (S-10)
- Mich. The Effectiveness of Selection in Beef Cattle Improvement.
To (1) establish measurements of most efficient beef cattle through study of rate of gain, efficiency of gain, breeding efficiency and carcass desirability, (2) develop and test methods of selection effective in accomplishing the above, (3) collect data on weaning weights, rate of gain, efficiency of gain and conformation to make possible a study of heritability of these characters, and (4) attempt to discover strains of cattle that excel in qualities listed under (1).
An. Husb. 96 (NC-1)
- Miss. A Study to Determine the Breeding Worth of Inbred and Outbred Bulls from Various Sources. To (1) compare growth rate, carcass quality, and maternal ability of progenies of bulls chosen as potentially superior sire, (2) develop high producing herd of cows using progeny of good producing bulls as replacements, and (3) determine effectiveness of selection index when used on heifers at weaning time.
An. Husb. 1 (S-10), coop. ARS
- Mo. Improvement of Beef Cattle Through Breeding.
To (1) develop more effective methods of selection for the improvement of performance in beef cattle, (2) develop more accurate and useful measurements of performance in beef cattle, (3) further test techniques of identifying "dwarf-free" and "dwarf-carrier" beef cattle, and (4) compare performance of "carrier" and "non-carrier" beef cattle.
An. Husb. 198 (NC-1)

Mont.

The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) establish inbred lines of Herefords, both horned and polled, that will result in improvement of such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality, (2) establish an improved herd of registered Angus cattle in which males are selected on high performance level as indicated by standard record of performance procedures, and (3) investigate feasibility of breeding for specific combining ability through recurrent selection.

An. Ind. and Range Mgt. 104, MS-873 (W-1), coop. ARS

Nebr.

Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) establish and evaluate selection criteria for improving performance in beef cattle, (2) determine inheritance of productive and deleterious characters, and methods for controlling them, (3) evaluate usefulness of various mating systems such as inbreeding, outbreeding, crossbreeding, or phenotypic assortative mating, (4) develop breeding procedures for improving performance of beef cattle, (5) develop lines of cattle with improved breeding value for such characters as rate and economy of gain, fertility, nursing ability and carcass quality, and (6) evaluate usefulness of existing stocks of beef cattle and their adaptability in various areas under different systems of management.

An. Husb. 334 (NC-1), coop. ARS

Nev.

The Effect of Environment on Selection for Traits of Economic Importance, The Relative Value of Several Selection Criteria, and Reproductive Studies in Range Beef Cattle. To determine (1) effect of environment on effectiveness of selection for several traits of economic importance in range beef cattle, (2) evaluate genetic-environmental interaction between area and method of production and several traits of economic importance in range beef cattle, (3) relative importance of rate of gain, economy of gain and a selection index based on overall merit as selection criteria for range beef cattle, including a. additional criteria to be developed and studied, b. study of measures of "efficiency of food utilization" and attempts to develop more satisfactory measures, and c. growth and development studies in range cattle, and (4) effect of reproductive efficiency on selection in range cattle, including a. attempts to develop a practicable early-pregnancy diagnostic method, b. relation of time or rate of maturation and fertility, c. attempts to determine and evaluate causes of infertility in range cattle, and d. attempts to develop a practicable method of synchronizing estrous cycle in range cattle.

An. Husb., Agron. and Range Mgt., Vet. Sci., Chem. 77 (W-1)

N. Mex.

Breeding Beef Cattle for Southwestern Ranges. To (1) determine or gather more information on the heritability of weight and grade at weaning, at yearling, and at maturity, (2) a. continue efforts to determine heritability of type and size, b. measure relative influence of sire and dam on offspring, c. determine feasibility of mating compact cows with large bull and large cows with compact bulls, and d. continue observations on hardiness, longevity, and reproductive efficiency of cows of two types, (3) gain more information on the heritability of carcass yield and grade, (4) a. develop methods of establishing lines of cattle free from dwarf genes, and b. establish a line of purebred Hereford cattle free of dwarf gene, or, if this proves impossible, a line in which the dwarf gene has a low frequency, (5) gain more information on heritability of type or form, (6) study influence of size and type of cattle on feed use and feed lot performance, (7) establish procedures or breeding plans to improve range cattle by making use of information gained in first two objectives, and (8) develop a line of purebred Hereford cattle adapted to range production in the Southwest.

An. Husb. 50 (W-1), coop. ARS

N. C.

The Improvement of Beef Cattle Through Breeding Methods. To develop and evaluate selection criteria for the improvement of productive efficiency and market quality of beef cattle.

An. Ind. 74 (S-10), coop. ARS

Ohio

The Improvement of Beef Cattle Through Breeding Practices. To (1) test existing inbred lines of Hereford cattle for general combining ability, (2) compare the get of production bred inbred Hereford sires with those of regular outbred sires, (3) preserve superior germ plasm which may be found in bulls used, and (4) evaluate selection criterion and develop procedures for improving performance of beef cattle.

An. Sci. 113 (NC-1)

Okla.

The Improvement of Beef Cattle by the Application of Breeding Methods. To (1) develop practical measures of performance and selection procedures for beef cattle handled under range conditions, (2) develop improved beef cattle by selection and mild inbreeding, (3) compare breeding and feeding performance of small and large type cattle, and (4) study individual variation and heritability of economically important traits in beef cattle.

An. Husb. 670 (NC-1), coop. ARS

- Oreg. The Improvement of Beef Cattle Through the Application of Breeding Methods. To (1) develop inbred lines of beef cattle that will be useful in improvement of rate of gain, economy of gain, carcass quality, fertility and longevity, and (2) effective breeding techniques in improving productiveness of beef cattle.
An. Husb. 1 (W-1), coop. ARS
- S. C. The Use of Brahman and Certain British Breeds of Beef Cattle in the Production of Fat Calves. To determine birth and weaning weights, market grades, carcass grades, and dressing percentages of fat calves sired by Brahman, Hereford and Angus bulls.
An. Husb. 25 (S-10)
- S. Dak. The Improvement of Beef Cattle Through Breeding. To study (1) usefulness of inbreeding and subsequent crossing as a mating system, (2) suitable methods of selection to be used independently and in conjunction with first objective, (3) investigate the productiveness of existing beef cattle, (4) test on farm bulls produced under (1) and (2), (5) compare bulls produced by different mating systems or selected on different bases when bred to comparable groups of cows, and (6) study various characteristics of heterozygous and normal beef cattle in an attempt to find a simple means of distinguishing between them.
An. Husb. 167 (NC-1), coop. ARS
- Tenn. The Improvement of the Producing Ability of Beef Cattle. To (1) develop lines, crosses, or combinations of beef cattle that will make most efficient use of Tennessee pastures and forages and result in an improvement of rate and economy of gain, carcass quality, fertility and longevity, (2) develop effective breeding techniques for improving productiveness of existing lines, (3) investigate productiveness of existing lines, and (4) test effect of different levels of nutrition on development of type, conformation, fertility, and longevity.
An. Husb. 15 (S-10), coop. ARS
- Tenn. The Detection of Animals Heterozygous for Recessive Bovine Dwarfism. To investigate methods of identifying at young ages animals heterozygous for recessive bovine dwarfism.
An. Husb. 86 (S-10), coop. ARS

Texas

Improvement of Beef Cattle within Pure Breeds and Certain of Their Crosses Through Breeding Methods, Based on Evaluation Tests for Efficiency and Rate of Gain, Heat Tolerance, and Carcass Value. To (1) improve beef cattle by selection based on rate and economy of gain, breeding efficiency, and carcass value, (2) evaluate cattle for adaptability to environment, especially heat tolerance, (3) develop a strain especially adapted to southern climatic conditions, using Brahman cattle and a European breed, and (4) improve carcass value of predominantly Brahman breeding by introducing characteristics from European breeds.

An. Husb. 650 (S-10), coop. ARS

Texas

Biochemical and Physiological Anomalies of Bovine Dwarfism and Their Use in Detection of Heterozygotes. To (1) detect biochemical and physiological anomalies associated with bovine dwarfism, in an attempt to identify metabolic defect(s) causing dwarfism, (2) learn extent to which biochemical and physiological factors which are anomalous in dwarfs vary in normal animals, (3) learn usefulness of variation of these factors in distinguishing between normal carriers and non-carriers of the genes conditioning dwarfism, and (4) use these factors in further study of mode of inheritance of dwarfism in beef cattle.

Biochem. and Nutr., An. Husb. 959 (S-10), coop. ARS

Texas

Methods for Measuring Potential Rate of Gain and Efficiency of Feed Utilization in Immature Beef Cattle. To develop methods of (1) biochemical or physiological nature which will measure in the immature animal, the potential rate of gain, and (2) measurement of the potential efficiency of use of feed for building body tissue.

Biochem. and Nutr., An. Husb. 714 (S-10)

Utah

The Improvement of Beef Cattle Through the Application of Breeding Methods. To test and develop lines of Hereford and Shorthorn cattle that will result in improved rate and economy of gain, fertility, nursing ability, carcass quality and longevity when maintained under Utah conditions. To investigate the productiveness of a line of Herefords founded on Advance Domino III, 2837737, and a line of Shorthorns founded on Cadet's Guard, 2098399.

An. Husb. 280 (W-1), coop. ARS

Va.

The Improvement of Beef Cattle for Virginia Through Breeding Methods. To study productivity of stocks now in use, and develop methods for estimating the breeding value with respect to type, growth rate and efficiency of young bulls.

An. Husb. 9371 (S-10), coop. ARS

Wash. The Improvement of Beef Cattle Through the Application of Breeding Methods. (1) Moderate Inbreeding within the Hereford, Aberdeen-Angus and Shorthorn Breeds. (2) By the Testing of Inbred Sires within the Various Lines Which Will Be Developed. To develop lines of beef cattle that will result in improvement in such characters as rate and economy of gain, fertility, nursing ability, longevity, and carcass quality.

An. Husb. 788 (W-1)

Wis. The Importance of Genetic and Environmental Influence on Characteristics of Economic Value in Beef Cattle. To (1) establish for beef cattle the relative effect of genetic and environmental influences on characteristics of economic importance which may be used in the development of a selection index, and (2) analyze physiological relationship between these important characteristics.

An. Husb., Genetics 871 (NC-1)

Wyo. The Improvement of Beef Cattle Through the Application of Breeding Methods. To determine (1) if body score, weight, and measurement of calves at weaning is correlated to age of dam in Angus, Hereford, and Shorthorns, (2) if body score, weight, and measurement of cattle one year and over are correlated to body score, weight, and measurement of their dams, (3) if body score of dam and sire can be used with any degree of accuracy to predict body score of progeny, (4) estimates of heritability for those factors considered, and (5) rate of gain and efficiency of feed use for all progeny retained past weaning.

An. Prod. 397 (W-1)

Wyo. Blood Typing Beef and Dairy Cattle to Study Possible Association of Blood Groups with Economic Characteristics. To (1) study possibility of genetic association between blood groups and economic characters, (2) study possibility of genetic association between blood groups and dwarfism, (3) study effect of inbreeding and/or linebreeding on blood group frequency, (4) establish possibility of, or disestablish parentage in doubtful cases, (5) search for additional blood groups in known blood systems, and for additional blood systems, and (6) study effect of, and control measures for anaphylaxis in immunized animals.

An. Prod., Vet. Sci. and Bact. 556, coop. ARS

Wyo. A Study of the Significance of Head Form in Beef Cattle. To study (1) pattern of head form development in young cattle, (2) association, if any, between head form development, dwarf factor, and other economic factors as early maturity, weight for age, and rate and efficiency of gain in beef cattle, (3) inheritance of head form.

An. Prod. 610 (W-1)

Physiology and Biochemistry

A. General

- Calif. Studies on the Energy Transformation in Organisms, Especially in Farm Animals. To study energy transformation in animals as (1) quantitative deficient food, (2) environmental conditions of body size, and (3) utilization of food energy.
An. Husb. 940
- Calif. Physiology of the Domestic Animals. To study the physiology of (1) reproduction, (2) ruminant stomach, and (3) the parathyroid gland as a control mechanism for the Ca level of the blood.
An. Husb. 941
- Calif. Steroid Metabolism in Domestic Animals. Elucidation of fundamental aspects of steroid physiology in domestic animals, especially in ruminants. Development of rational therapeutic measures in endocrine disfunction and/or other metabolic derangements manifested via altered steroid physiology.
An. Husb. 1659
- Mich. Hormone Studies Related to the Physiology of Domestic Animals Including Investigations with Radioactive Isotopes. To study (1) thyroid physiology of laboratory and domestic animals, (2) nutritional hormonal interrelationships during growth and reproduction, (3) effects of hormones on growth, maturation, and reproduction, (4) relation of hormones to milk secretion, and (5) metabolism of hormones in the animal body.
Poul. Husb., Vet. Med., An. Husb. 25
- Minn. Chemical and Biological Studies on Animal Nutrition. To study (1) the hemagglutinating activity of Soyin, a toxic protein of soybean flour, (2) the mechanism of inhibition of trypsin by various trypsin inhibitors, (3) the biological function of orotic acid, (4) mechanism of the toxicity of trichloroethylene-extracted soybean oil meal, (5) energy transformation of enzyme reactions, (6) effect of amino acid diets on liver lipids, and (7) the composition of rats' milk.
Biochem. 1506, coop. Nat'l Science Foundation; ARS

Minn. The Effect of Maternal Nutrition on Development, Growth, and Performance of the Young. Small laboratory animals will be used for initial studies. Dietary restrictions of mothers in caloric, protein, mineral, and vitamin intake, as well as production of acute temporary vitamin deficiencies by means of vitamin analogues, will be used as experimental techniques. The young will be studied with respect to birth weight, anatomical malformations, vitamin content of tissues, viability, growth, and development. Similar observations will be made with animals fed the best diets that can be devised. Chemical studies will be made on the blood and tissues of mothers and young to study relation between maternal and fetal composition under various conditions. With young born to mothers on restricted diets, a study will be made on the effect of optimum vs. suboptimum nutrition on growth and performance. This may indicate whether deleterious effects of prenatal nutrition can be corrected later.

Biochem. 1514

B. Reproduction and Lactation

Minn. A Study of the Physiology of Reproduction with Special Emphasis on Degrees of Fertility. To (1) study normal prenatal development in pig that is already well advanced, (2) study females that give evidence of being in process of resorbing their fetuses with the objective of finding underlying causes, and (3) determine causes of failure of both males and females to mate and produce offspring.

An. Husb. 1409

Minn. A Study of the Use of Endocrines as a Means of Increasing and Maintaining Levels of Fertility in the Male. To (1) determine causes of low fertility in problem bulls used in artificial insemination and to provide methods to increase their fertility levels; (2) develop management, feeding, and semen collection methods to improve semen production in bulls for artificial insemination; (3) develop improvements in techniques and equipment for inseminating cows; and (4) develop satisfactory laboratory tests on semen samples to measure relative degree of fertility in bulls.

An. Husb., Dairy Husb., Vet. Sci. 1411

Miss. A Study to Determine the Use of Exogenous Progesterone in the Control of the Reproductive Phenomena in Beef Cows. To (1) determine dosage of progesterone needed in beef cattle to best control ovaries in production of viable ova; (2) determine effect of various dosages on endometrium as shown by survival and development of viable ova; and (3) when a most optimum dosage is found, conduct a second experiment comparing results from this dosage when used on another group of cows, with results from a comparable group of non-treated control animals.

An. Husb. FE-7

- Mo. Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To (1) make a thorough study of the chemistry and/or biochemistry of male and female germ cells in order to gain knowledge which is needed as a basis for future investigations involving a. ova and spermatozoa storage and preservation, b. artificial insemination, c. ova transfer, d. fertilization mechanism, and e. chemistry and physiology of gene action; (2) investigate the enzyme systems and metabolic activities of male and female gametes, the results of these studies being basic requirements for further work on storage media, cold shock phenomenon of spermatozoa, low temperature storage of ova and spermatozoa, and possibly to other reproductive processes or activities affecting fertility and litter size; (3) characterize and isolate certain factors present in egg yolk, boiled milk, chick - embryos and other biological tissues which aid in preservation of the viability of spermatozoa of farm animals and protect them against a number of adverse environmental conditions including sudden lowering of temperature; and (4) make further investigations into the physical requirements of male and female germ cells.
An. Husb. 81
- N. J. Factors Influencing the Ability of Beef Cows to Produce Milk. To determine the influence of (1) injecting an estrogen and thyroprotein feeding on duct growth in the udder of a beef heifer, and (2) estrogens on the mammary glands of hyperthyroid guinea pigs.
An. Husb., Dairy Husb. and Mfg. 130
- Oreg. The Measurement and Improvement of Fertility in Farm Animals. (1) The Evaluation of Semen Production and Libido in the Male Farm Animals. (2) The Role of Hormones and Nutrition on Gamete Production, Prenatal Survival, Mating Response, and the Estrual Cycle. (3) The Effect of Breed, Season, Age, and Management upon Fertility. To determine (a) effect of chemical, physical, and bacteriological factors upon semen quality and fertility, and (b) effect of age and frequency of service on semen production and quality. To determine effect of the hormones, Progesterone, F.S.H., L. H., and Testosterone, on gamete production, fertilization rate, prenatal survival, and mating response. To determine (a) concurrence of estrus and ovulation in the postpartum female and its relation to subsequent fertility, (b) factors influencing age at puberty and relationship of age at puberty to subsequent fertility, and (c) effect of breed differences on breeding behavior and fertility in farm animals and the relationship of season to breed response.
An. Husb. 155-1, 2, 3

Tenn. The Effect of Radiation on Reproductive Physiology in Farm Animals. To evaluate effects of acute and chronic irradiation on reproductive physiology and growth in farm animals on (1) semen characteristics, (2) potential fertility in the male, (3) estrual cycle phenomena in the female, (4) potential fertility in female, (5) endocrine system, and (6) growth of young animals.
An. Husb. 65, coop. ARS

Texas A Study of the Maturation Process in the Ova of Mammals. To (1) determine normal maturation process of egg nucleus in cow, ewe, sow, mare, and mule; (2) ascertain maturation response of egg nucleus during induced ovulation in both the follicular and luteal phase of the cycle; and (3) obtain data for cause of infertility of mammalian eggs.
An. Husb. 854

W. Va. Reproductive Efficiency of Beef Cattle. To learn practicability and effects of breeding beef cows at first heat after delivery, incidence of ovulatory anomalies in cattle and their effects on reproduction, and compare reproductive efficiencies of two breeds of beef cattle when managed under like conditions.
An. Husb. 69

Wis. The Physiology of Reproduction in Farm Animals with Special Reference to Endocrine Relations. To determine definite reproductive states in animals (particularly cattle), the endocrine mechanisms responsible, and methods of modifying them.
Dairy Husb., Gen. 532

Wis. Factors Involved in Fertilization Failure and Early Embryonic Mortality in Cows of Low Fertility. To (1) determine phases of reproductive process where most failure occurs, (2) develop methods of diagnosis of cause in herds under field conditions, (3) identify reproductive failures of a particular nature with most likely cause, and (4) develop, on the basis of findings, researches on breeding, nutrition, disease, and management to correct existing low fertility.

An. Husb., Vet. Sci., Gen. 532a

Wis. Forage Composition and Crop Management as Related to Reproductive Disorders in Cattle on Marsh Areas in Central Wisconsin. Survey in detail plant populations in pastures where abortions have occurred and in those where occurrence is seldom; correlate plant species present with same or other species with known adverse effect. Feed experimental animals plants which might cause abortion in cattle. Study management of unfavorable pastures to see if time of pasturing, stage of growth, season, or past treatment may be involved. Experiment with various treatments or seedings to test factors previously shown as sources of difficulty.

Agron., Vet. Sci. 957

C. Rumen Digestion

Ark. Methods of Improving the Digestion and Utilization by Beef Cattle of Roughages Produced in the South. To (1) improve digestion and use of roughages by beef cattle through proper supplementation, and (2) obtain further information on relation of digestion and use of southern-grown roughages to changes in physical and chemical composition of plants as effected by methods of management and handling.

An. Ind. and Vet. Sci. 371

Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin, and combinations) and fibrous feeds, by rats, pigs, cattle, and sheep through use of ad libitum and paired feedings, N balance, and digestibility, (2) make chemical studies on methods of analysis and isolation of fibers, and (3) apply findings to the utilization of forage.

An. Husb., Engin., Agron. 1569

- Ill. Utilization of Roughages by Dairy Cattle. To provide fundamental information on optimum nutritive conditions for use of forages by dairy cattle and on value of various roughages in feeding dairy cattle.
Dairy Sci. 35-314 (NC-25)
- Ill. Studies on Protein and Carbohydrate Metabolism in Ruminants, Especially as Affected by Rumen Microorganisms. Increase efficiencies in those metabolic processes of rumen microorganisms by which nutritional demands of ruminants may be satisfied.
Dairy Sci. 35-315
- Iowa Increasing the Usefulness of Forage Crops and High-Cellulose Roughages by Improved Rumen Function (Zymo-Chemistry) in Beef Cattle and Sheep. To (1) increase usefulness of forage crops and high-cellulose roughages through improved rumen function or improved bacterial digestion within rumen of beef cattle and sheep, and (2) work for better nutrition in cattle and sheep resulting from improved rumen function especially in those animals subsisting largely upon low-grade roughages and forages.
An. Husb., Dairy Ind., Chem. 1208
- Kans. A Study of the Intermediary Metabolism of Rumen Microorganisms with Reference to the Formation of End Products from the Carbohydrates of Roughage. Elucidate mechanisms in formation of end products, as fatty acids, from the carbohydrates of roughage. Study interrelationship of apparently nonuseful end product methane with production of useful carbonaceous end products. Isolate enzyme systems capable of carrying on one step reactions found in carbohydrate fermentation.
Bact., Dairy Husb., An. Husb. 425 (NC-25)
- Kans. Interrelationships of Feedstuffs Combinations, Appetite, Rumen Function, Digestibility, and Rumen Microorganism in Roughage Utilization. To learn (1) interrelationships of feedstuffs combinations, appetite, rumen function, digestibility, and rumen microorganisms so as to explain differences among animals in their ability to utilize roughage, (2) parts played by rumen microorganisms and combinations of feedstuffs in efficiency of roughage utilization.
Dairy Husb., An. Husb. 455

Mass. Effect of Various Silages on Fatty Acid Levels in the Mature Bovine Rumen. To (1) ascertain levels of total steam volatile fatty acids in mature bovine rumen when various silages are fed, and (2) compare relative proportions of acetic, propionic, and butyric acids produced under these conditions.

An. Husb. 1025

Mich. The Chemical Determination of the Carbohydrate Fraction in Various Forage Crops and Their Isolation and Identification. (1) To investigate the suitability of existing chemical methods for determining the various carbohydrates in forage crops and devise new methods whenever necessary. (2) To make a systematic chemical study of the carbohydrates in forage crops consumed by ruminants. (3) To investigate environmental conditions which influence the composition of forages. (4) To conduct digestion trials on the forages under investigation whenever feasible.

Chem., Dairy 811 (NC-25)

Mo. Ruminant Digestion. To (1) develop surgical, chemical, and bacteriological techniques which can be routinely applied to the study of ruminant digestion, (2) determine effect of food nutrients, antibiotics, and other chemicals on rumen flora and fauna, (3) optimum level and source of soluble carbohydrates for maximum cellulose use in sheep, (4) inoculate animals, with a functioning rumen flora, at the time of major ration changes and evaluate the subsequent performance of the animals, and (5) determine effect of inoculating lambs in early life on subsequent performance.

An. Husb., Chem., Vet. Med. 168

Mo. Ruminant Digestion. A. Rumen Culture. To (1) set up in laboratory an artificial rumen with conditions simulating those found in natural rumen, (2) study by quantitative chemical analysis the changes that occur in a ration as it is fermented in artificial rumen, (3) study methods of preserving rumen organisms so they will be available for inoculation of artificial rumen, and (4) study effects of these preserved rumen microorganisms on a ruminant.

Chem., Vet. Med. 152-a

Mo. Nutritive Value of Foods.--a. Nutrients in Grains, in Forage Crops, and in Rations of Ruminants Before and After Fermentation in an Artificial Rumen by Rumen Microorganisms.
To (1) compare nutritional value of newer forages; (2) obtain further data on effect of fertilizer treatments on nutritional properties of plant; (3) study amino acid content of practical rations which support rapid growth of chicks and find what amino acids are deficient in feedstuffs which permit only slow growth of poultry; (4) study improvement of ovine and bovine rations, in vitamin and amino acid content, during fermentation with rumen microorganisms in an artificial rumen, a. to study synthesis of essential amino acids in low protein rations containing urea and b. to find whether nutritional properties of cottonseed oil meal can be improved by this procedure; and (5) determine percentage of zein protein in crude protein of 55 samples of exotic corn grains obtained from the Iowa State College Experiment Station.
Chem., Field Crops 212-a

Nebr. The Mechanism of Digestion of Polysaccharides from Roughages by Microorganisms of the Rumen. Identification of products of digestion of polysaccharides from roughages by bacteria from rumen. Investigation of mechanism of utilization of degradation products of polysaccharides.
Dairy Ind. 491 (NC-25)

N. Dak. Roughage Utilization by Ruminants. To (1) study, by rumen fistula and digestion trials, value of poor quality roughage for sheep, (2) compare ability of cattle and sheep to use good and poor roughages, (3) study feasibility of altering rumen microflora of sheep by inoculating with rumen contents from cattle, (4) determine why sheep do not consume poor quality roughage as do cattle and if poor quality roughage is force fed, if it would be digested, and (5) find methods of making greater use of roughage common to northern Great Plains.
An. Ind. 19

Ohio Digestion Studies: 7. Factors Affecting the Utilization of Feeds by Ruminants. To (1) determine factors affecting roughage digestion in ruminants, using an artificial rumen technique, (2) determine by in vitro methods factors in non-protein nitrogen utilization by rumen microorganisms, and (3) apply and further determine factors important in rumen function, using cattle experiments directed towards greater efficiency of utilization of low-grade roughages.
An. Sci. 33

Ohio

The In Vitro Digestibility of Cellulose from Various Sources and the Effect of Lignification Thereon. To (1) learn the digestibility (in vitro) of cellulose and cellulose-containing crude fiber fractions isolated from feedstuffs (corn cobs, oat hulls, wheat bran, alfalfa leaves and stems, timothy, and straws), and (2) try to assess effect of lignification of materials on digestibility of cellulose in these materials.

An. Sci. 132 (NC-25)

Okla.

The Effect of Steroids on Microbial Carbohydrate Utilization. To determine (1) effect of cholesterol, estradiole, stilbestrol, estrone, testosterone, progesteron, vitamin D, and cortisone in respect to stimulation or inhibition of microbial growth and use of glucose, maltose, sucrose, starch, (2) if the microorganisms under observation are capable of using any of the steroids listed as a sole source of carbon for growth and reproduction, and (3) if the steroids affect extracellular enzyme production.

Bact. 892

Va.

The Isolation, Propagation, and Nutrition Requirements of Cellulose-Decomposing Bacteria Found in the Rumen of Cattle that are Consuming High-Roughage Feeds. To (1) isolate cellulose-decomposing bacteria from rumen of cattle and design methods for propagation in quantity, and (2) investigate nutritional requirements of cellulose-decomposing bacteria as to carbon, N, minerals, and unidentified growth factors.

Biochem. and Nutr., An. Husb., Dairy Husb., Biol. 8438

Va.

The Effect of Various Protein and Non-Protein Nitrogen Sources on Protein Assimilation by Rumen Microorganisms. To (1) determine if non-protein N of types used in cattle feeds suppresses decomposition of feed protein by rumen microorganisms, and (2) compare proteins of forage crop stems and leaves, seed proteins, and animal proteins of high biological values of N sources in protein synthesis by rumen microorganisms.

Biochem. and Nutr., An. Husb., Dairy Husb., Biol. 8439

D. Ruminant Bloat

Ind. Effect of Alteration of Diets on Digestive Disturbances of Ruminants. To (1) determine to what extent alteration of ratio of different constituents in diet affects ruminant digestion, (2) determine if acute bloat or engorgement toxemia occur as a result of changes, and (3) develop practical means to prevent and treat both diseases.
Vet. Sci., Biochem. 724

Ind. Biochemical Aspects of Ruminant Bloat. To (1) determine what constituents of feeds and forages increase the incidence of bloat, and (2) to determine what biochemical compounds and reactions are involved in bloat.
Vet. Sci., Biochem., Agron. 828

Iowa Physical and Chemical Aspects of Bloat. To (1) study effect of dietary components and therapeutic agents on physical and chemical characteristics of rumen ingesta, (2) determine relation of dietary characteristics to incidence of bloat, (3) determine various physical and chemical characteristics of rumen ingesta and of blood and other tissues from bloated animals, (4) ascertain efficacy of prophylactic procedures and therapeutic agents, and (5) determine relation of physical characteristics of animal to incidence of bloat.
An. Husb., Dairy Ind., Chem., Vet. Med., Agron. 1267 (NC-27)

Mich. Investigations of the Causes and Methods of Control of Frothy Bloat. To (1) determine the chemical and physical properties of saliva, (2) determine the relationship of saliva and its components to frothy bloat, (3) determine the effect of rations on the amount of froth produced, and (4) determine the role of microorganisms in the production and stabilization of froth in the rumen.
Dairy, Chem. 812 (NC-27)

Minn. Bloat-Producing Mechanisms in Ruminants. To (1) attempt to clarify presently poorly understood motor control mechanisms in the ruminant stomach, with particular reference to the fore-stomachs, and (2) attempt to develop a bioassay procedure for toxic, bloat-producing legume extracts.
Vet. Sci., Dairy Husb., Biochem. 2624 (NC-27)

Mo. Changes in the Physical Structure of Roughages During Growth and Digestion. To note changes in physical structure, as indicated by X-ray diffraction and electron microscopy, of wheat and Lespedeza during their growth and digestion by rumen microorganisms.
Phys. 250 (NC-25)

N. Car. Studies on Bloat in Ruminants. Learn normal physiology of eructation. Produce bloat experimentally. Learn chemical and physiological differences between feeds and ingesta associated with bloated animals and those associated with normal animals.
An. Ind. RM60

Ohio Bloat in Ruminants. I. Causes. To investigate causes of bloat based on clinical observations, examination of rumen samples for hydroscopic properties, volatile fatty acid content and microorganism variations and examination of blood concentrations of nitrogenous constituents.
Vet. Med., Dairy Sci., An. Sci., Agron. 123 (NC-27)

Nutrition and Management

A. Pasture and Forages

Ariz. The Evaluation and Utilization of Low Quality Roughages as Feeds for Livestock in Arizona. To evaluate by chemical analyses, digestibility trials, and palatability studies, roughages and by-product feeds present in Arizona and which possess nutrient deficiencies and palatability limitations. - Learn effective and economical methods for efficient utilization of these low-quality roughages.
An. Husb., Dairy Husb., Agron. & Range Mgt. 388

Calif. Nutritive Value of Specific Range Forage Species as Influenced by Seasons, Fertilization, and Management. To learn (1) techniques for measuring consumption, a. esophogostomy, b. clipping, c. hand selection, d. reference substances-lignin, chromic oxide, chromogens, and (2) nutritive value of specific range species, a. chemical composition, b. digestibility, c. mineral availability, d. fiber utilization.
An. Husb., Agron. 1670 (W-34)

- Colo. An Investigation of Unidentified Nutritional Factors in Alfalfa and Certain Range Plants. To (1) study and identify unidentified nutritional factors in alfalfa and various browse types indigenous to Colorado range land, which are known to enhance the over-all value of rations to which they are added, (2) determine manner in which such substances as stated above, act to supplement or improve rations in which they are included, and (3) determine optimum levels of supplementation of above-mentioned factors.
An. and Dairy Ind. 176
- Colo. The Value of Native and Seeded Range Grasses and Supplementation Required in the Nutrition of Beef Cattle. To (1) study the nutritive value of native and seeded range grasses grazed in rotational pattern by beef cattle, (2) investigate by chemical analysis seasonal changes in nutrient losses from range cover to rodents, insects, weathering, and trampling cattle, and (4) study the effect on beef production of protein supplementation regarding to balance seasonal nutrient variation in range grasses.
An. and Dairy Ind. 229 (W-34)
- Del. Nutritive Evaluation of Forages. To determine (1) yields of digestible nutrients of forage crops cut at various stages of maturity and produced under different management procedures, (2) yield of digestible nutrients when various forages are grazed or when various systems of grazing are used, (3) if the rabbit can be used to test the digestibility of forages which are produced to be consumed by other species.
Agron. and Eng. 132-532 (NE-24)
- Fla. Herbage Composition and Animal Response as Influenced by Pasture Management. To evaluate nutritional qualities of herbage grown under specified conditions in terms of animal response and of the composition of the herbage.
An. Husb. and Nutr. 356
- Ga. The Fattening of Beef Calves on Winter Pasture. To determine (1) value of different winter clovers and grasses for fattening beef calves, (2) effect of addition of grain to steers while fattening in winter pasture, and (3) effects of above feeds on rate of gain, economy of gain, finish, market price, meat quality, refractive index, and health of animals at 14-16 months.
An. Husb. 48

- Ga. Maximum Use of Summer-Grown Roughage in a Steer Fattening Program. Study Use of maximum amounts of spring and summer grown roughages, hay or silage, fed with different kinds and levels of grain supplementation in a steer fattening program.
An. Husb. 50, coop. ARS
- Ga. Use of Annual Winter Pasture for Fattening Steers in the Coastal Plain of Georgia. Study value of annual winter pastures in steer fattening program when grazed alone and when supplemented with limited amounts of various carbohydrates and roughages.
An. Husb., Agron. 108, coop. ARS
- Idaho Beef Cattle Nutrition on Seeded and Native Forage in Idaho. To determine the nutrient content, total digestible nutrients, and digestible energy of forage consumed by cattle when grazing at different intensities and seasons of use on (a) seeded areas (primarily crested wheatgrass) and (b) native forage or unseeded areas; determine the effect of intensity of grazing on nutrient intake and livestock production, i.e., weight, calf crop, grade, etc.; determine the need for and value of various nutritional supplements for cattle subjected to the above grazing treatments; and to apply the nutritional results obtained to better beef cattle production and range management practices.
An. Husb., Chem. 46 (W-34), coop. ARS
- Ill. Comparative Value of Pelleted Versus Loose Forage Crops for Beef Cattle Feeding. To compare alfalfa fed as long hay, chopped hay, pellets and silage as to gains, feed consumption, palatability, and economy in wintering steer calves.
An. Sci. 40-329
- Ind. Balancing Roughages for Growing and Fattening Cattle. To (1) test effect of certain modifications of Purdue cattle supplement A on use of roughage by cattle, (2) compare nutritive value of various roughages for growing and fattening cattle, and (3) determine other factors essential for roughage use and study nutritive value of such roughage as corn stover, wheat straw, oat hulls, peanut hulls, etc.
An. Husb. 692
- Kans. Fundamental Nutrition Studies of Sorghum Roughages and Grains. II. A Study of the Digestibility of Sorghum Silage. To determine the coefficients of digestibility of sorghum silage when fed alone and in conjunction with a high-protein concentrate.
An. Husb., Chem. 222-2

Kans. Nutritive Value of Forages as Affected by Soil and Climatic Differences. To study (1) differences in nutritive value of forages as affected by variations in fertility and other characteristics of soils, and (2) effects of climatic factors.

Dairy Husb. 430

Ky. The Values of Urea and of Synthetic Alfalfa Ash in a High Roughage Ration for Fattening of Steers in Drylot. To perfect synthetic alfalfa ash that will produce as much or more beneficial effect on gains as will true alfalfa ash when fed in a ration containing a high level of low-quality roughage to steers in drylot.

An. Ind. 71

Ky. Factors Affecting the Utilization of Low-Quality Roughage by Stocker Steers. Learn effects of adding following materials to rations composed principally of low-quality roughage and used for purpose of wintering stocker feeders that are to be grazed without grain following season: (1) corn distillers dried grains with solubles, (2) alfalfa meal, (3) trace minerals, (4) urea, and (5) molasses.

An. Ind. 86

La. Comparison of Roughages for Winter Feeding and Maintenance of Beef Cattle. To (1) continue the study and comparison of feeding value of roughages available in Louisiana for wintering beef cattle, and (2) determine relative value of concentrate mixture when fed with available roughages commonly found in Louisiana.

An. Ind. 782

Md. Nutritive Evaluation of Forages. To (1) determine nutritive value of forages fed to dairy cattle as affected by stage of maturity at harvesting, fertilizing, and management practices, (2) evaluate different methods of harvesting and preserving forages, (3) determine total yield of nutrient material per unit of land from forages subjected to the above management procedures, and (4) aid in development of improved chemical techniques for evaluation of forages.

An. Husb., Agron. G-47 (NE-24)

Mass.

Quality in Roughage: Phase I. A Study of the Factors Which Influence Composition, Palatability, and Value for Milk Production of Roughages (Hay and Silage) Grown in Northeastern United States. Phase II. The Nutritive Evaluation of Forage by Means of Production Trials and Laboratory Tests. To (1) determine the value for milk production of forages grown for that purpose in this region, with special emphasis on those crops or combinations of crops of relatively recent introduction in comparison with others that are more or less indigenous, (2) determine the effect on nutritive value of forage crops (both those recently introduced and the indigenous species and combinations) of increased use of fertilizers and improved methods of harvesting and storing, and (3) to correlate the results of milk production trials of these crops with chemical analyses and other potential indicators of forage quality in the search for a relatively simple test that might be used as criterion for quickly judging the nutritive value of forages.

Agron., An. Husb., Chem., Feed Control Lab. 1038 (NE-24)

Minn.

Investigations of the Carbohydrates of Forage Crops with Emphasis on the Hemicelluloses. To investigate chemical nature and structure of carbohydrates of forage with emphasis as above. To accomplish by (1) isolating hemicelluloses from brome grass and from alfalfa, (2) degrading hemicelluloses or derivatives prepared therefrom into components as pentoses and uronic acids and their derivatives; separate and identify latter by chemical and physical properties; determine quantitatively relative proportions of various components of hemicellulose molecules, (3) deduction from objective 2 manner in which components are linked together, thus providing basis for studies of susceptibility of various linkages to cleavage by enzymes of rumen microorganisms.

Biochem., Dairy Ind., An. Ind. 1518 (NC-25)

Miss.

A Study of Rations for Wintering Mature Beef Cows. To determine relative value of several rations for wintering bred beef cows in Mississippi.

An. Husb. BE-3

- Miss. A Study to Determine the Relative Value of Different Winter-Grazing Crops for Finishing Weanling Calves. To determine relative value of various crops for production of winter grazing as measured by (1) rate of gain and total beef produced per acre, (2) cost of beef production, and (3) length of grazed period and tendency to winter kill.
An. Husb. FE-10
- Miss. A Study to Determine the Value of Supplements for Improving the Utilization of Low-Quality Roughages. Learn kind of supplementation needed for maximum utilization of low-quality roughages by wintering beef cattle.
An. Husb. FE-13
- Mo. Mineral Content of Foods and Feeds Grown in Missouri.
a. Mineral Content of Lespedeza and Bluegrass Grown in Missouri. To analyze the 70 samples of lespedeza or bluegrass and associated soils collected in 1950 and 1951 and make a third collection of these same species and soil from the same sites in growing season of 1952 and to analyze them for nitrogen, crude fiber, crude fat, total ash, calcium, molybdenum, cobalt, manganese, zinc, phosphorus, sulfur, chlorine, boron, and iodine.
Chem. 147-a
- Mo. Pasture Improvement. A. Pasture of Cattle.
B. Relation of Type of Animal to Rate of Gain. C. Periods of Maximum Response to Different Pastures by Steers.
(a) To fatten steers during grazing season, checking health, weight gains, and management practices, for marketing purposes; (b) to determine the type of steer which makes the best gains from pasture; (c) to determine periods of greatest gain for cattle on various pastures.
An. Husb. 154-a, b, c., coop. ARS
- Mo. Forage Poisoning Caused by Drought. To (1) develop a quick chemical test to predict if forage would be toxic to farm animals, (2) learn if toxicity of forage declines after ensiling, and (3) study physiological effects of high nitrate intake on farm animals and investigate ways of counteracting the effects.
An. Husb., Field Crops, Vet. Med. 247

- Mo. The Effect of Nitrate in Feedstuffs on the Performance of Sheep and Cattle. To (1) observe effect of feeding forages, grown under conditions which favor high nitrate accumulation, on the rumen function and general performance of sheep and cattle, and (2) learn if effects observed in (1) can be duplicated by adding nitrate to the normal ration of cattle and sheep.
An. Husb. 251
- Mont. The Amino Acid Composition of the Proteins of Montana Grasses. To study (1) methods for extracting proteins from dried grasses, (2) amino acid composition of the proteins of grasses, and (3) effect of age of plant on amino acid composition of the proteins.
Chem. 39, MS 738
- Mont. Supplemental Feeding of Livestock on Native Range. Learn botanical and chemical composition of range forage and use of various species. Feed beef cattle supplements containing nutrients deficient in range forage and note effect of supplementation on growth, weight gains, reproduction, and blood composition of beef steers fed supplements during fall and winter grazing. Learn about creep-feeding of range calves.
An. Ind. and Rge. Mgt. 108, MS 956, coop. U. S. Rge. Livestock Exp. Sta. (ARS), (W-34)
- Nebr. Value of Specific Roughages in Rations Containing Equivalent Levels of Known Essential Nutrients for Fattening Cattle. To (1) determine comparative values of alfalfa hay, brome grass hay, and prairie hay as roughages in rations for fattening beef cattle, and (2) compare the value of urea, soybean oil meal, and alfalfa hay as nitrogenous supplements in fattening rations.
An. Husb. 456
- Nev. The Feeding Value of Meadow Hay for Wintering Beef Cattle as Influenced by the Variation in Nutritive Content When Harvested at Different Stages of Plant Maturity. To determine how hay lands should be managed so as to make the maximum contribution to the year-long hand feeding and grazing operations of a ranch and range cattle enterprise.
An. Husb. 67

- Nev. Possible Conservation of Range Forage as Based upon Daily Weight Gains of Cattle on Summer Range. To determine if cattle intended for market make monthly gains from the time they are turned on the range in the spring until they are gathered in the fall, usually in late September and early October.
An. Husb., Agron. and Rge. Mgt. 69
- Nev. Beef Production on Irrigated Farms. To learn feasibility of producing beef on irrigated lands not in range or native vegetation.
An. Husb., Econ. 83
- Nev. The Nutritive Value of Range Forage and Its Relationship to Reproduction and Growth of Range Livestock as Modified by Nutrient Supplementation. To (1) determine the botanical and chemical composition of the diet of range livestock as modified by location, season, climatic conditions, and management practices with special reference to nutrient deficiencies, nutrient excesses or toxic materials, (2) determine the effects of various kinds and amounts of seasonal supplementation upon growth, reproduction, blood and body composition during both the period of supplementation and subsequent periods in terms of nutrient requirements under range conditions, (3) study the utilization of range forages by livestock as determined by growth, digestibility, metabolism, and body composition studies, and (4) the development of adequate techniques to facilitate the completion of these objectives.
An. Husb., Agron. and Rge. Mgt., Vet. Sci., Chem. 8 (W-34)
- N. H. The Nutritive Evaluation of Forage for Dairy Cattle.
(1) Improve and standardize procedures for nutritive evaluation of forages for dairy cattle. (2) Compare values for energy as net, digestible, metabolizable, and compare digestible dry matter and total digestible nutrients determined on same forage. (3) Learn effect of stage of maturity and level of N fertilization on nutritive value of certain forages. (4) Learn effect of variables on nutritive value of acre yield. (5) Learn effect of variables on excretion of certain B complex vitamins.
Dairy Husb., An. Husb., Agron. 51 (NE-24)

- N. J. Relationship of Time of Cutting to Digestibility of Hay from Alfalfa and Birdsfoot Trefoil. To determine the digestibility of (1) alfalfa hay cut during the one-tenth, one-half, and full-bloom stages, and (2) birdsfoot trefoil hay during the one-tenth, one-half, and full-bloom stages.
An. Husb. 90 (NE-24)
- N. Mex. The Effect of Various Food Supplements upon Roughage Digestion in Ruminants. To determine by digestion trials the digestibility of a native range hay as influenced by the addition of various food supplements.
An. Husb. 3
- N. Mex. The Composition of Range Forage Related to the Requirements of Cattle. Develop monthly and yearly pattern of blood carotene, vitamin A, and inorganic P of breeding cows on representative range land. Learn levels of carotene, vitamin A, and inorganic P in blood of range cows. Correlate carotene and P content of forage consumed with that of blood. Compare and evaluate results of blood test found in winter and spring with present standards and with patterns found for southern New Mexico. Determine the chemical composition and seasonal variation for most important range forage plants in ten representative areas. Learn loss or variation of different nutrients caused by wintering and leaching. Measure available P of soil and its relation to plant P.
An. Husb., Agron. 52 (W-34)
- N. Y.
Cornell The Development and Use of Indirect Methods for the Measurement of Digestibility and Rate of Consumption of Feedstuffs, Particularly Pasture Forages, by Ruminants. To (1) test adequacy of indicator methods (chromogen and Cr_2O_3) previously developed with steers for measurement of digestibility and intake of grazing cows, and/or modify these to effect reliable measures with cows; (2) compare effectiveness of feeding Cr_2O_3 in concentrate feeds with administering it in capsules; (3) study reliability of intake estimates as influenced by 1 and 2 dosages per day; and (4) attempt to work out a rapid method for determination of chromic oxide.
An. Husb. 58 (NE-24)

N. Y.
Cornell

The Relationship of Time of Cutting to the Digestibility of Different Forages. Learn (1) digestibility of energy and dry matter of first cuttings of orchard grass, brome grass, timothy, alfalfa, Empire birdsfoot trefoil, red clover, Viking birdsfoot trefoil, and Ladino clover cut May 20, June 7, and July 25, (2) digestibility of aftermath growth when cut at various intervals, (3) influence of irrigation on digestibility of forage, (4) effect of N fertilizer on digestibility of grasses, (5) relationship of leaf and moisture content to digestibility.

An. Husb., Agron. 90 (NE-24)

N. Y.
Cornell

A Comparison of Different Intensities of Grazing with Green Crop Feeding of an Improved Pasture Mixture. To compare different intensities of grazing with green-crop feeding of an improved pasture mixture to obtain data on milk production per cow and per acre, seasonal carrying capacity, herbage consumption per cow, chemical composition of herbage and its relationship to consumption and digestibility, botanical composition, and cost of production.

An. Husb., Agron. 120 (NE-24)

N. Car.

Ladino Clover-Grass Pastures for Fattening Cattle. To study (1) methods of using Ladino clover-grass pastures to fatten cattle for market, (2) response of steers grazing Ladino clover-grass pastures to graded levels of grain, (3) forage consumption and digestibility by steers on graded levels of grain, (4) effects of various winter treatments on subsequent performance of grazing steers receiving graded levels of grain, and (5) contribution of clover and of grass in Ladino clover-grass pastures.

An. Ind., Agron. 62

Ohio

Pasture Species for Beef Animals. To answer (1) can Reed canary grass be used by beef animals, (2) how does animal production on Reed canary grass compare to production on bluegrass, (3) when improving a pasture on heavy soils of Northeast Ohio should be plowed or left unplowed, and (4) how much production can be expected on areas that cannot be plowed because of stones or other obstacles?

Agron., An. Sci. 2-5

- Ohio Improvement of the Method for Determining the Crude Fiber and Nitrogen-Free Extract (N.F.E.) of Feeds. To improve crude fiber method of analysis so that the crude fiber determination will be a measure of the fraction of the feed that is undigestible carbohydrate fraction and the N.F.E. (by difference) is the readily digestible fraction.
An. Sci. 5
- Okla. Improving the Utilization of Low-Quality Roughages. To determine (1) value of alfalfa ash in utilization of low-quality roughages, (2) mineral deficiencies of roughages, which are improved by addition of alfalfa ash, (3) effective combinations of inorganic elements for more efficient use of low-quality roughages, and (4) practical supplements to supply nutrient deficiencies of low-quality roughages.
An. Husb., Chem. 874
- Ore. The Development and Application to Feeding Practices of Techniques for Measuring Range Feed Consumption and Quality by Beef Cattle. To (1) develop indicator techniques suitable for the determination of digestibility of mountain flood meadow hays in the wintering ration for beef cattle, (2) apply such techniques to the estimation of intake and digestibility of range forage by grazing beef cattle, and (3) study how to efficiently and economically supplement sagebrush range for grazing cattle, based on information obtained under objectives one and two.
An. Husb. 264 (W-34)
- Pa. Utilization of Forage by Beef Cattle. To (1) evaluate methods of utilizing high quality pasture and harvested forage in feeding beef cattle, (2) measure relative cost of beef production under feeding systems in which concentrates are replaced with pasture and harvested forage, and (3) evaluate relative quality of beef produced under various feeding systems used.
Agron., An. Husb. 1245
- Pa. The Nutritive Evaluation of Forages. To (1) determine the digestible dry matter, digestible protein, and digestible energy of forages of particular value in the Northeast, using sheep as the experimental subjects, (2) determine the above constituents on forages produced by the New Hampshire station for special cooperative studies. Metabolizable energy is also being determined on three of these forages, and (3) compare nutrient values of forages as measured by sheep with those measured by other techniques (cattle, rabbits, chemical analysis, etc.)
An. Nutr. 1263 (NE-24)

- R. I. Nutritive Evaluation of Forages. Learn nutritive value of forages fed to dairy heifers as affected by stage of maturity, learn nutrient yield of forages fed per unit of land, study effect of stage of plant maturity on cellulose and lignin content.

Agron., An. and Dairy Husb. 33 (NE-24)

- S. Dak. Nutritive Value of Grasses and Hays of the Northern Great Plains. To obtain data on composition, digestibility, and productive value of pastures and hays. More specifically to (1) determine by feeding trials, digestion, and where necessary metabolism trials, the nutritive value of grasses cut for hay and stored at shooting stage, seed ripe stage, and mature stage, using hay from different parts of the State representing different soil, weather, and grass conditions, (2) store sufficient hay by stacking or other methods that a feeding trial and/or digestion trial can be conducted each year for five years on hay stored one, two, three, four, and five years, to stabilize feed supplies and livestock production by storing feed grown in good feed production years to provide adequate feed in dry years, (3) to formulate a livestock program from the information known and gained in objectives 1 and 2 as to digestibility, feeding value, protein, minerals, quality of forage, time of making maximum use of pastures and hays, supplements needed, etc., and (4) to find a simpler method for determining digestibility of growing pasture grass and feeds, using steers, that will reduce cost, time, labor involved, etc.

An. Husb., Agron., Biochem. 120

- S. Dak. Chemical Analysis of Grass Silage with Different Methods of Storage. To (1) analyze newly ensiled samples for carotene, protein, ash, crude fiber, ether extract, nitrogen-free extract and moisture, and compare with analysis of samples taken at feeding time from silos, and (2) make moisture determinations on silage as it is weighed out to determine bulk losses at time of feeding.
Biochem. 237-D (NC-23)
- Utah Nutritional Deficiencies in Range Forage and the Supplementary Feeding of Range Livestock. To (1) determine the botanical species and chemical composition of the diet of range livestock with special reference to deficient or excessive nutrients and toxic materials, (2) note effect on calf and lamb crop and other production factors after supplementing deficient diets or instituting preventive or corrective measures for diets with excessive or toxic materials which are consumed by range livestock, (3) develop techniques of handling range livestock for detailed experimental research, and (4) study methods of determining digestibility and metabolizable energy content of various species and mixtures consumed by cattle on ranges. Sheep may be used for comparisons.
An. Husb., Forestry and Range Mgt. 421 (W-34)
- Wash. The Effect of Various Constituents on the Utilization of Wheat Straw by Pregnant Beef Heifers. To (1) compare effects of feeding wheat straw and alfalfa hay on the performance and well being of pregnant heifers, (2) increase use of wheat straw by a. increasing available N, b. attempting to balance mineral needs of the rumen microflora and the host heifer, (3) a. determine if pregnant heifers, consuming primarily wheat straw, will obtain sufficient vitamin A to prevent deficiency syndromes, b. determine extent of vitamin A deficiency, if any, and (4) determine if small amounts of dehydrated alfalfa will stimulate the consumption and use of wheat straw.
An. Husb. 1242
- W. Va. Measuring the Nutritive Value of Forage Crops. Development of chemical and/or biological techniques for the determination of the nutritive value of forage crops.
Biochem., Agron. and Genetics, An. Husb. 70
- Wyo. Nutritional Evaluation of Wyoming Feeds. To determine coefficients of digestibility of the protein in high quality native hay produced in Wyoming.
An. Prod., Chem. 566

Wyo. Range Livestock Nutrition. To (1) determine the digestibility of harvested forages and/or supplements used for wintering range livestock, (2) determine chemical composition and nutritive value of range forage as related to performance of cattle and sheep, (3) develop more satisfactory methods of range nutrition research, and (4) compile and review existing data on range forage plants, poisonous plants and toxic materials in Wyoming forages.

An. Prod., Agr. Res. Chem., Agron. 613 (W-34)

B. Concentrates

Colo. Varying Amounts of Concentrates and Roughages in Cattle Fattening Rations. To determine effect of varying proportion of concentrates to roughages fed cattle on (1) feed use, measured by weight gain, feed eaten, and digestion trials, and (2) market outcome, measured by live and carcass grades, yield, shrink, degree of finish and economy of production.

An. and Dairy Ind. 152

Idaho Concentrate-To-Hay Ratios for Growing and Fattening Cattle. To establish (1) optimum economical ratio of concentrate to hay for growth and fattening, and (2) minimum protein requirements for the various ratios of concentrate to hay.

An. Husb. 52

Ill. Evaluation of the Concept of Biological Value of Protein for Growth and Maintenance. To (1) learn relationship between protein quality and percentage of protein in diet required to produce maximum gain at different levels of intake of protein and energy, and (2) learn relationships between biological value of protein, protein concentration in diet, and energy intake.

An. Sci. 20-306

Ill. The Nutritive Value of Grains Grown Upon Rich and Poor Soils. To complete analyses of samples now on hand, statistical analyses of data accumulated over past several years and publication of results.

An. Sci. 20-355

Ill. Supplementing Wintering Rations for Steer Calves. To study (1) grass silage, corn silage, and hay as a wintering ration for steer calves, and (2) combinations of soybean meal, corn, and feeding fat as a supplement for these roughages.

An. Sci. 40-324

- Mich. The Use of Nitrogenous Materials in Ruminant Nutrition.
To (1) determine optimum protein levels needed to obtain maximum use of roughages, (2) determine extent to which urea or other simple N sources can be used in place of natural protein, and (3) establish role of other nutrients such as trace minerals and organic growth-promoting factors required to produce maximum digestion of cellulose and other rather indigestible components of feeds.
An. Husb., Chem. 118
- Miss. A Study of Levels of Protein and Energy Intake and Their Effect Upon Productive Efficiency of Beef Cattle. Learn protein and nutritional level most nearly optimum for highest production in beef cattle.
An. Husb. BE-5
- Miss. A Study to Determine the Value of Corn and Blackstrap Molasses in the Rations of Beef Cattle and the Effect of These Carbohydrates on the Microbial Flora of the Rumen.
To (1) compare corn and molasses as sources of readily available carbohydrates for beef cattle, and (2) determine if any differences can be observed in microbial flora of rumen, and digestibility of rations.
An. Husb. FE-6
- Miss. A Study to Determine the Protein Requirements of Fattening Yearling Cattle. To learn amount of protein supplement needed by fattening yearling cattle fed on a basal ration of (1) oats and Johnson grass hay in dry lot, and (2) corn and Johnson grass hay in dry lot.
An. Husb. FE-12
- Nebr. Nutritional Factors Affecting Roughage Utilization by Cattle. To (1) determine effect of various protein levels alone and as influenced by addition of carbohydrates and minerals; (2) determine value of adding cane molasses to roughage rations when different levels of protein are fed; (3) determine value of adding trace minerals to roughage rations with different levels of protein; and (4) observe combined effects of molasses and trace minerals when added to roughage rations when different levels of protein are fed.
An. Husb., Chem. 445

Nebr.

The Use and Value of Beef Tallow in Cattle Fattening Rations. To (1) determine effect of adding beef tallow to cattle fattening ration, (2) determine quantitative effect of edible and inedible beef tallow in a cattle fattening ration, and (3) compare effect of edible and inedible beef tallow in cattle fattening ration.

An. Husb., Biochem. and Nutr. 447

Ohio

Relationship Between Various Feeds or Nutrients and the Protein Requirements of Fattening Cattle. To (1) re-evaluate protein needs of fattening cattle, (2) determine effect of molasses, trace minerals, and other factors on utilization of protein and energy, and (3) relate objectives 1 and 2 to type and quality of roughage fed.

An. Sci. 30

Okla.

A Study of Various Supplements or Substitutes for Corn and Cottonseed Meal for Fattening Beef Calves: Study of Various Substitutes for Corn and Cottonseed Cake for Fattening Steer Calves. To (1) determine optimum levels of protein for a steer-fattening ration, (2) determine value of urea as a substitute for cottonseed meal in steer-fattening ration, (3) compare value of cowpeas (Chinese Red variety) and cottonseed meal when fed at same level of crude protein in steer-fattening ration, (4) compare alfalfa hay and cottonseed meal as source of protein when each is fed to fattening beef calves, (5) study effect of varying amount of protein supplement according to age of steer and time on feed, as compared to uniform distribution of same average amount over entire feeding period, (6) determine value of addition of trace minerals to steer-fattening rations, (7) compare feeding value of new varieties of grain sorghum to corn for fattening steer calves, (8) study value of alfalfa hay in ration of grain sorghums, cottonseed meal and sorghum silage, and (9) determine value of dehydrated alfalfa meal pellets as partial replacement for cottonseed meal in fattening rations for steer calves.

An. Husb., Chem. 394

- Okla. Protein and Non-Protein Nitrogen Utilization by Ruminants.
To determine (1) effect of different levels of carbohydrate in ration on use of protein, and other feed nutrients, by ruminants, (2) under practical feed-lot conditions, relative value of urea and how it may be used to best advantage in supplementing protein of rations for growing and fattening lambs, (3) value of adding small amounts of methionine to rations containing urea and rations containing natural feed proteins, (4) compare value of ammoniated cane molasses as partial replacement for cottonseed meal for wintering stocker cattle on native grass, (5) compare two methods of feeding ammoniated cane molasses to beef cattle on dry grass-hand fed in bunks versus sprayed on dead grass, (6) determine, by use of digestion trial data, optimum level of furafeed for steer calves and comparative value of furafeed and cottonseed meal when supplying equal amounts of N in rations for steer calves, and (7) determine if high levels of furafeed are toxic to sheep.
An. Husb., Chem. 709

- Okla. New Supplements in Fattening Rations for Yearling Steers.
To (1) evaluate certain new beef cattle supplements relative to standard oil meal when fed on an equal protein basis and used to supplement feeds common to Oklahoma, (2) develop improved beef cattle supplement of a simple mixture of feeds known to contain nutrients beneficial to rumen bacteria, and (3) study relative value of sorghum silage and prairie hay in limited-grain rations for fattening yearling steers.
An. Husb., Chem. 819

- Okla. Effect of Various Concentrate-To-Roughage Ratios on the Feedlot Performance of Steers and Heifers. To (1) study effect of certain concentrate-to-roughage ratios for self-feeding fattening yearling steers and heifers to a. rate of gain, b. efficiency of feed utilization and economy of gain, c. necessary time on feed to reach desired slaughter grade, and d. quality of carcass produced; and (2) compare performance of steers versus heifers within each level of concentrate to roughage.
An. Husb. 893

- P. R. The Utilization of Concentrates in the Feeding of Live-Stock in Puerto Rico. To determine most economical quantities and qualities of concentrate feeds or grain mixtures that may be used satisfactorily for milk, meat, and egg production.
An. Husb. and Vet. 51

S. Car. Dried Citrus Pulp in the Ration of Steers Fed in Dry Lot. To determine (1) effect of citrus pulp on rate and economy of gains, (2) value of citrus pulp as partial replacement for corn, (3) effect of citrus pulp in fattening ration on quality of beef produced, and (4) effect of citrus pulp on time needed for blood clotting.
An. Husb. 77

S. Car. Factors Affecting Feed Utilization by Ruminants. To learn (1) value of feed supplements to pasture and other roughages, and (2) use of urea and other organic nitrogenous compounds as additives to molasses, and other farm-grown carbohydrate feeds.
Dairy Husb., Chem., An. Husb. 93

Texas An Evaluation of Animal and Vegetable Protein Feeds With Respect to Chemical Composition and Feeding Value. To (1) determine cystine content of farm feeds and human foods, (2) develop method for stabilization of tyrosine during hydrolysis of food materials for amino acid assay, (3) determine tyrosine content of farm feeds and human foods, and (4) improve microbiological methods for determination of amino acids and to adapt these methods to rapid analysis of the large number of samples necessary in feed control work.
Biochem. and Nutr., An. Husb. 521

W. Va. Methods to Increase Non-Protein Nitrogen Utilization by Ruminants. To evaluate a variety of non-protein nitrogenous compounds which may be useful as replacements for protein concentrates in ruminant rations containing a high proportion of roughage.
An. Husb., Biochem. and Nutr. 69

C. Feed Adjuvants

Calif. The Effect of Hormones on the Growth and Fattening of Meat Animals. To learn (1) types of hormones best suited for increasing growth or carcass quality, (2) most effective dose, (3) influence of age, sex, and dietary conditions on effect of treatment, and (4) mechanism by which hormones influence metabolic activities.
An. Husb. 1662

- Colo. The Effect of Hormones, Drugs, and Similar Substances on Nutrition of Livestock. To (1) determine the effect of these substances when fed as part of the ration and when administered parenterally on feed-lots responses and carcass grade and yield, (2) determine by individual digestion trials the influence of these substances on the digestibility of feeds and the efficiency of nutrient utilization, (3) determine by chemical and/or biological methods the natural and added concentrations in feed stuffs of the substances enumerated above, (4) determine by chemical and biological methods the residues of these substances, if any, deposited in organs and tissues, and (5) determine by gross and microscopic examination of organs and tissues any effect ascribable to treatment with these substances.
An. and Dairy Ind. 182
- Miss. A Study of the Use of Diethylstilbestrol in Fattening Steers and Heifers. To learn value of above as feed supplement for fattening cattle and heifers under Mississippi conditions.
An. Husb. FE-9
- Ohio The Influence of Sex Hormones upon Growth Rate, Fattening, and Carcass Quality of Feeder Calves. To (1) compare growth rate, fattening, and carcass quality of steer and bull calves, (2) determine influence of diethylstilbestrol implants in steers and bulls upon performance in feed lot and upon quality of carcass, and (3) study excretion rate and carcass retention of stilbestrol after subcutaneous implantation.
An. Sci. 78-1 (NC-1)
- Tenn. Studies of Endocrine Relationships in Farm Animals: C. Beef Cattle. To study (1) effects of steroid hormones on rate of growth, feed efficiency, and carcass characteristics in beef cattle, and (2) role of endocrine system in reproduction and growth in beef cattle.
An. Husb. 42-C
- Wash. The Effects of Animal Fat, Antibiotics, and Stilbestrol Administered to Fattening Steers Consuming Good and Poor Quality Roughage. To (1) determine the influence of high levels of animal fats in ruminants ration on a. digestibility and efficiency of utilization of the fat and associated dietary constituents, b. vitamin A stores in the liver, c. characteristics of the deposited fat, and e. total blood lipids; (2) determine the influence of dietary stilbestrol and/or aureomycin on feed efficiency, digestibility of high and low fat and good and poor quality roughage diets; (3) determine the influence of site of introduction of fat and aureomycin deposition on digestibility of feed nutrients; and (5) determine the effects of animal fat, aureomycin, and stilbestrol on carcass characteristics.
An. Husb. 1217

Wis. Market Value and Nutritional Quality of the Meat from Livestock Receiving Stilbestrol. The objectives of these experiments are to investigate (1) the effect of diethylstilbestrol added to various rations on carcass quality, weight gains, and feed efficiency of beef cattle, (2) effect of feeding stilbestrol to beef cattle on the nutritive value of the carcass, and (3) effect of ingested stilbestrol on the concentrations and distribution of fat, protein, water, vitamins, and estrogenic activity in the bodies of beef cattle.

An. Husb., Biochem., Genetics 967

Wyo. The Effect of Stilbestrol on the Performance and Carcasses of Steers. To (1) study the effect of feeding stilbestrol to steers on the rate of gain and feed efficiency, and (2) study the effect of feeding stilbestrol on the yield, carcass grade, shrink in storage, and quality and composition of the carcass.

An. Prod., Vet. Sci. and Bact., Agr. Res. Chem.,
Home Econ. 599

D. Minerals

Ariz. Nutritional Studies on Arizona Range Plants and Cattle. To determine (1) cobalt, manganese, copper, and molybdenum content of major forage plant species eaten by range cattle, and (2) amount of these minerals occurring in blood and liver of range animals--with attempts to correlate a deficiency or toxicity condition with a change in composition of these minerals.

An. Husb. 183

Calif. Studies of Mineral Metabolism in Animals: I. Calcium-Phosphate Relations. II. Iodine Metabolism in Cattle and Sheep. III. Mineral Deficiencies on Range Lands--Calcium, Manganese, Cobalt, Sulfur, and Other Minerals. To (1) study the effect of a low phosphorus diet on reproduction, (2) continue search for a goitrogenic substance in the water from Hat Creek, and (3) study nutritional conditions in various parts of the State where livestock production cannot be maintained at a maximum level on native vegetation alone.

An. Husb. 938

- Calif. The Relation of Dietary Mineral Levels Upon Calcium and Phosphorus Metabolism and the Incidence of Parturient Paresis (Milk Fever) in Dairy Cattle. Learn influence of prepartal dietary mineral intake on Ca. and P metabolism of cow and upon incidence of milk fever. Find palatable ration supplying sufficient nutrients for gestation and that will prevent milk fever, and find management procedures applicable in control.
An. Husb., Dairy Ind. 1663, coop. Ext. Service
- Fla. Mineral Requirements of Cattle. To investigate role of mineral elements in nutrition of cattle, with particular emphasis on interrelationships of elements in development of nutritional abnormalities observed in Florida.
An. Husb. and Nutr., Dairy Sci. 133
- Fla. Investigation of Mineral Nutrition Problems of Livestock Through the Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral interrelationships that occur in farm livestock, using suitable laboratory animals.
An. Husb. and Nutr. 346
- Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
An. Husb. and Nutr. 566
- Miss. Survey of the Coastal Region of Mississippi to Locate Possible Cobalt and Other Mineral Deficient Areas. To study cattle and analyze plants from the coastal area of Mississippi in order to locate cobalt deficient areas if they exist, and study other essential mineral elements.
An. Husb. BE-1
- Mo. The Mineral Nutrition of Ruminants. To (1) reevaluate qualitative and quantitative mineral requirements of ruminants, (2) learn mineral element(s) or combinations of elements in alfalfa ash which is (are) effective in stimulating appetite and improving performance of cattle and sheep fed low quality roughage, and (3) obtain more data on role of mineral imbalances in etiology of "stiff lamb" disease, urinary calculi, and tetany.
An. Husb. 248

- Mont. The Calcium, Phosphorus, Magnesium, and Vitamin A Content of the Blood of Hereford Cows and Their Calves at the U. S. Range Livestock Experiment Station. To correlate the Ca, P, Mg, and vitamin A content of blood of cows and calves on range with analyses of soil and range plants from pastures on which cattle are grazed, with the rates of growth and reproduction of the cows, and with development of urinary calculi on calves.
Vet. Res. Lab. 52, MS 825
- Mont. Mineral Nutrition of Cattle and Sheep. To (1) compare winter performance and following summer performance on pasture of beef calves wintered on low-phosphorus grass hay with hay ad libitum and varying amounts of phosphorus and trace minerals added, and (2) study effect of phosphorus nutrition on blood carotene and vitamin A levels.
An. Ind. and Range Mgt., Vet. Res. Lab. 102
- Okla. The Availability to Ruminant Animals of Phosphorus in Various Phosphorus Supplements. To learn (1) relationship between P intake and gain in weight, bone calcification, inorganic P level of blood plasma, true digestibility of P and balance of P in steer calves, and (2) availability to steer calves of P contained in certain mineral supplements and feeds.
An. Husb., Chem. 880
- Ore. The Role of Minor Elements in Animal Nutrition. To determine the distribution of "trace" or "minor" elements of importance in animal nutrition and livestock disorders. To apply this information to problems in the fields of nutrition and livestock production.
Dairy Husb., Chem., An. Husb. 154

S. Dak. Selenium Poisoning. To (1) obtain basic information on biochemistry and physiology of selenium toxicity in animals; (2) determine with laboratory animals methods to counteract toxicity of selenium; (3) adapt information now available and that obtained through objective 2 on factors which alleviate selenium toxicity in small animals for use in farm animals; (4) explain metabolism of selenium by plants, to establish chemical forms of selenium in plants and determine toxicity of compounds isolated; and (5) adapt basic information obtained from plant, geologic, and soil studies in past to practice of mapping seleniferous land in detail.

An. Husb., Biochem. 19, coop. SCS

Tenn. Mineral Metabolism in Animals: I. Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals. To (1) determine the normal distribution of these mineral isotopes administered by the various routes to cattle, swine, and sheep, and to study thereby in detail the normal absorption, utilization, and skeletal metabolism of selected minerals in these animals; (2) measure endogenous losses of calcium and phosphorus and from these values determine maintenance requirements in the various species as a function of age; (3) determine the biological availability of calcium and phosphorus from the common dietary sources of ruminants, and simple stomached animals, and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc., upon the availability; and (4) apply radio-isotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.

An. Husb. 52, coop. AEC

Wis. Mineral Metabolism and Mineral Requirements of Animals. To study (1) the effect of mineral supplements of various kinds of animals fed low lime rations, (2) the role of inorganic compounds containing such elements as iron, copper, nickel, cobalt, zinc, and manganese, and (3) factors responsible for nutritional anemia and effect of various inorganic elements and compounds in correcting such anemias. Fundamental investigations on the phenomena of hemoglobin building on the body will be continued.

Biochem., Dairy Husb., An. Husb. 8

Wyo.

The Selenium Problem as Related to Poisoning in Animals.

To (1) study effect of selenium poisoning on the metabolism of the phosphorylated compound in vivo by the use of radioactive phosphorus, (2) study effect of selenium poisoning on sulfur, (3) study metabolism of selenium in animals fed with plants containing selenium in organic and inorganic form, and (4) convert elemental selenium to soluble selenium by ruminants.

Agr. Res. Chem. 491

Wyo.

Selenium in Vegetation, Water, and Animal Tissues.

To (1) have a geological map of principal seleniferous areas of the State, (2) correlate quality of stock water with geological outcrops, (3) attempt to explain plant response to different forms of soil selenium, and (4) determine what constitutes a selenium value of clinical significance in livestock injury from ingestion of seleniferous vegetation.

Agr. Res. Chem. 493

E. Vitamins

Ala.

The Tocopherol Content of Feeds and Forages and the Significance of Vitamin E in the Nutrition of Farm Animals.

To (1) determine concentrations of total tocopherol, alpha tocopherol, and unsaturated fatty acids in representative feeds, feeding stuffs, and forages, as influenced by stage of maturity, environmental conditions and processing or treatment and storage, (2) survey blood serum levels of tocopherol, unsaturated fatty acids, and vitamin A in cattle and sheep under various feeding practices, in various diseases, (3) determine influence of diet and dietary factors on development and cure of nutritional muscular dystrophy in rabbits and of "white muscle disease" in cattle, (4) ascertain cause and nature of lightened, slate-grey color of muscle in "white muscle disease," and analogous condition in rats and rabbits, and (5) determine if vitamin E is important in swine nutrition.

An. Husb. 323

Ark.

Nutritive Principles in Green Feed. To demonstrate, isolate, and identify the unknown or little understood nutritive principles of green feed, and to determine the part each plays in the growth, health, and reproduction of the various species of laboratory and farm mammals.

An. Ind. and Vet. Sci. 167

Colo. Vitamin A Nutrition of Beef Cattle in Colorado:
III. Vitamin A Nutrition in Reproduction and Lactation
of Beef Cattle. IV. Vitamin A Nutrition in Relation to
Other Nutrients in the Growth and Development of Young
Beef Cattle. To study (1) need of vitamin A in preparation
of heifers and bulls for reproduction, (2) vitamin A nutri-
tion in gestation, parturition, and lactation of cows, (3)
digestibility of carotenoids by cattle, and (4) vitamin A
nutrition in relation to other nutrients in growth and
development of young beef cattle in relation to protein
level, and to mineral levels and balance.
An. and Dairy Ind. 24-III, IV

Colo. A Rachitic Condition Shown by Heavily Fed Cattle
Receiving Adequate Calcium, Phosphorus, and Vitamin D.
To determine (1) cause of a rachitic condition shown by
many high quality cattle when fed heavily on nonrachitogenic
rations, and (2) control or elimination of such development.
An. and Dairy Ind. 25

Colo. The Utilization of Carotene in the Animal Body. The
procedure involves preliminary studies on rabbits and chickens
to determine their ability to store vitamin A and carotene, a-
study of body stores as related to ration constituents, deter-
mination of the cause of variation in the mobilization and
utilization of vitamin A and carotene in the animal body,
isolation and identification of specific substances found
to be a factor in the carotene-vitamin A picture, and a study
of the effect of physiological processes taking place in the
digestive tract of ruminants, swine, and poultry on carotene,
vitamin A, and such extrinsic factors as have been found to
exist.
Chem. 87

Minn. The Relation of Nutrients to Metabolic Processes. A wide
variety of techniques and procedures will be used to study with
laboratory animals and with tissues derived from them and from
larger animals the chemical reactions involved in metabolic pro-
cesses and the enzymes associated with them. Attention will
initially be focused on (a) the metabolic function of vitamin E,
studying (1) the possible importance in enzymic oxidation-reduc-
tion processes of a primary oxidation product of vitamin E which
has already been recently discovered and isolated in this lab.,
and (2) the relation of vitamin E to oxidative phosphorylation
processes in the organism; (b) the role of potassium in metabolic
phosphorylations associated with the utilization of glucose; (c)
the possibility that thyroxine may form a reversible oxidation
product; and (d) the nitrogen metabolism in the early postnatal
period.
Biochem. 205-2215

- Mont. Nutritional Muscular Dystrophy in Calves. To (1) determine if muscular dystrophy can be induced in calves by avitaminosis E; (2) determine alpha-tocopherol content of milk from cows of beef breeds in herds where calves are affected annually with muscular dystrophy; and (3) observe and obtain data on development of spontaneous muscular dystrophy in calves.
Vet. Res. Lab. 53, MS 905
- N. Mex. The Relation of Forage Carotene and Phosphorus to the Blood Plasma Carotene, Vitamin A, and Inorganic Phosphorus of Range Cows. To (1) develop monthly and yearly pattern of blood carotene, vitamin A, and inorganic P of breeding cows in important grazing areas and vegetative types, (2) determine levels of carotene, vitamin A, and inorganic P in the blood of range cows, (3) correlate carotene and P content of the forage consumed with the blood carotene, and inorganic P analyses, and (4) compare results of these blood tests found during winter and spring with present accepted standards, and also with patterns found for southern New Mexico.
An. Husb. 36
- Ohio The Effect of Adsorbents and Minerals on the Determination of Riboflavin and Other B-Complex Vitamins and on Their Availability to Animals. To (1) determine effect of adsorbents and minerals on present accepted methods of assaying for riboflavin and other B-complex vitamins, and (2) study effect of adsorbents and other B-complex vitamins to animals.
An. Sci. 3
- Okla. The Correlation of Vitamin A Liver Stores with Plasma Vitamin A in Cattle. To (1) study storage of carotene and vitamin A and the use of such stores by beef cows during maintenance, reproduction, and lactation; a. study correlation of liver and plasma vitamin A levels in cows during reproduction and lactation, b. correlate liver stores and plasma levels and vitamin A and carotene with the amount in the diet and milk, c. study effect of body reserves of vitamin A and carotene of cow on the liver and plasma levels of the calf at birth and during the nursing period, and (2) study effect of level of carotene intake and other dietary conditions on the absorption and utilization of carotene by steers.
An. Husb., Chem. 747

Ore. Determination of Nature and Control of White Muscle Disease. To (1) determine further the nature and relationship of so-called white muscle disease of calves and lambs; (2) determine cause(s) of the disease; (3) develop more rapid and effective methods of diagnosis, particularly in live animals; and (4) develop program for preventing or controlling the disease(s).

Chem., An. Husb., Vet. Med. 175, coop. Exten. Serv.

Pa. A Study of the Interrelationships of Pyridoxine (Vitamin B₆) with Certain Organic and Inorganic Nutrients. To learn effect of experimentally induced B₆ deficiency on metabolism of minerals and of certain energy supplying nutrients in rats.

An. Nutr., An. Husb. 1264

Wis. The Effect of Vitamins and Other Organic Nutrients on the Growth, Milk Production, and Reproduction of Animals. To determine factors concerned with the adequate nutrition of farm animals as related to Wisconsin conditions.

Biochem., An. Husb. 10

F. Management Practices

Calif. Range and Livestock Management in the Granite Area of the Sierra Foothills, San Joaquin Valley. Investigation of non-specific abortions and stillbirths in range cattle, range fertilization, range rodent damage, self-feeding range cattle with salt-concentrate mixtures as compared to daily hand feeding, using agricultural gypsum instead of salt in self-feeding of concentrates, congenital deformities in range cattle, range forage deficiencies and toxic substances, effect of high-protein diet on first calving of 3-year-old heifers.

An. Husb. 1005

Ga. Forage Consumption and Methods of Wintering Beef Cows on Pasture. To determine the value of (1) hay in addition to grazing while on winter pastures, and (2) cost of wintering cattle on winter pasture versus dry-lot feeding.

An. Husb., Chem. 47

- Ill. Pasture Investigations. XV. The Age at Which to Breed Beef Heifers. To compare (1) effect on size and mature weight of cows bred as yearlings to calve at 2 years of age as compared with cows bred as 2-year-olds to calve at 3 years of age, (2) size of offspring of initial and subsequent calvings of these two groups, (3) total pounds of beef a cow will produce at weaning time during the more productive years of her life, depending upon whether she was bred initially as a yearling or as a 2-year old; and to study effect on later breeding regularity of heifers bred as yearlings as compared with heifers bred as 2-year olds.
An. Sci. 40-315, coop. SCS
- Ind. Influence of Winter Gains and Level of Grain Feeding on Pasture Upon the Output of Beef Per Acre. To (1) establish the quantitative relationship between the level of winter feeding of yearling steers and their subsequent output of beef per acre from unsupplemented pasture, (2) determine the influence of supplemental grain feeding on pasture upon the output of beef per acre, (3) determine the interaction of the level of winter feeding and level of grain feeding on pasture, and (4) determine the most economical combination(s) of level of winter feeding and grain feeding on pasture.
An. Husb., Econ. 827
- Kans. Factors Influencing Profitable Grass Utilization and Sound Pasture Management. A. Wintering and Grazing Steer Calves. B. Wintering, Grazing, and Fattening Heifers. C. Wintering and Grazing Yearling Steers. D. Wintering, Grazing, and Fattening Steers. (1) To determine effects of different wintering regimes on subsequent pasture gains and the value of supplements fed after mid-summer, (2) To a. develop a system of deferred full feeding for heifer calves, b. compare different rations for heifers, and c. compare various methods of finishing heifers, (3) To a. develop methods of wintering and grazing yearling steers, b. determine optimum level of protein feeding during the winter on dry bluestem pasture, and c. determine effect of feeding a protein supplement during latter part of grazing season to 2-year-old steers on bluestem grass, (4) To a. compare self-feeding grain on grass after August 1 with self-feeding grain in dry lot, and b. determine value of trace minerals in cattle program which uses bluestem pasture.
An. Husb. 253-1, 2, 4, and 6
- Miss. A Study of Different Methods of Finishing Steers to be Marketed in Late Summer and Fall. To determine relative value of various methods of finishing steers on feeds available in Mississippi as measured by (1) rate of gain and length of feeding period, and (2) net returns per steer.
An. Husb. FE-2

- Miss. Methods of Finishing Yearling and Two-Year-Old Steers for Market. To determine the relative value of (1) various methods of finishing steers as yearling and 2-year-olds on pasture with and without an additional feeding period of oats and wheat, and (2) sod-seeded pastures as compared to pastures planted on regularly prepared seedbed for winter grazing.
An. Husb. FE-8
- Mo. Pasture Improvement: A. Pasture of Cattle; B. Relation of Type of Animal to Rate of Gain; C. Periods of Maximum Response to Different Pastures by Steers; D. The Incidence of Bloat and Methods for Its Control. To (1) fatten steers during grazing season, checking health, weight gains, and management practices, for marketing purposes, (2) determine the type of steer which makes the best gains from pasture, (3) determine periods of greatest gain for cattle on various pastures, and (4) determine under what conditions pastures produce a high incidence of bloat, and if simple methods of management can be used to control it.
An. Husb. 154
- Mo. Factors Affecting Gains of Stocker Cattle. To (1) determine feeding value of various farm-grown roughages in winter rations, (2) determine value of winter pastures, and (3) develop a management system that will give best returns from wintering and summer grazing periods.
An. Husb. 236
- Mo. Production of Young Beeves. To (1) determine advantages and disadvantages accruing to January-February and March-April dropped calves when both groups are fed grain while suckling dams on pasture and fattened, post weaning to same degree of finish, (2) discover production needs of "improved" pastures, concentrates, and management, (3) study carcass quality and grade, and (4) unveil production problems currently unrecognized.
An. Husb., Chem., Econ. 237
- Nebr. Methods of Feeding Cattle from the Standpoint of Experimental Design. To determine and evaluate differences in response of cattle to hand-feeding versus self-feeding in groups and individually.
An. Husb. 440

- N. Mex. Wintering Stocker Calves. To (1) compare rations containing moderate and liberal amounts of T. D. N. for stocker calves in regard to rate of gain made by calves, cost of feed for wintering, cost of additional gain produced by heavier ration, and effect on gains made on range the following summer; and (2) determine effect of weight of stocker calves on rate of gain, amount of feed needed for wintering, and returns for feed used.
An. Husb. 53
- Okla. Relation of Nutrition and Age at First Calving to Lifetime Performance of Beef Cows. To repeat certain phases of the original study in attempts to more clearly define effects of low, medium, and high levels of supplemental winter feed on the growth and development of beef heifers, the difficulty encountered at first calving, and subsequent reproductive performance.
An. Husb., Chem. 650
- Okla. Relation of Level of Wintering to Production of Feeder and Grass Fat Steers. To (1) determine effect of level of wintering three successive winters upon the performance of long three-year-old steers fattened on grass alone, (2) determine effect of level of wintering of two successive winters upon the performance of long two-year-old steers fed corn on grass the second summer grazing season, (3) produce fat two-year-old steers using a maximum of grass, (4) compare two levels of feeding corn on grass to two-year-old steers which have been wintered at a "high" level, and (5) compare the management system of producing two-year-old feeder and slaughter steers.
An. Husb., Chem. 655
- S. Car. The Economy and Rate of Gain and the Quality of Meat Produced by Steers Fattened in Dry Lot and on Winter Forage. To determine (1) relative cost of fattening steers in dry lot and on pasture with supplementary grain, (2) relative value of such home-grown feeds as corn, oats, and cottonseed meal for steers fed on forage, and (3) compare quality of beef produced by steers fattened in dry lot and those fed on pasture.
An. Husb., Agron., Econ. 72

Carcass Evaluation

- Colo. The Use of the Somascope and/or Other Physical or Chemical Means for Improving the Accuracy of Determining Market Grades in Live Slaughter Cattle. Learn depth and distribution of fat on live slaughter cattle and if any relationships exist between finish of same and their carcass grade and/or qualities of meat when cooked. Establish objective grade specifications based on finish and other characteristics for use with somascope and other chemical means of grading and test to see if these are feasible and economically efficient means. Investigate specific gravity as a procedure for measuring marbling of selected muscles and relationship of marbling with carcass grade and quality of cooked beef.
Home Ec., Econ. and Soc., An. and Dairy Ind. 27
- Ill. Factors Affecting Quality of Beef Carcasses. Study validity of measures of quality as currently used by beef trade, develop precise objective measures of factors which contribute to beef quality, relate factors which contribute to carcass quality to those which can be measured easily in live animals.
An. Sci., Econ. 20-371
- Iowa The Influence of Dietary Supplementation Selection and Breeding on Carcass Quality and Tissue Composition of Meat Animals. To determine (1) effects of protein, fat, antibiotics, trace minerals, calcium and phosphorus of swine rations on carcass quality and tissue composition; (2) effect of roughage, protein and protein substitutes, and hormones on quality of lamb and beef carcasses; and (3) make additional studies, largely biochemical, to support objectives above.
An. Husb. 1239
- Minn. Factors Affecting Market Quality of Beef Cattle Carcasses. To (1) learn effects of stilbestrol on beef carcass quality, (2) learn market value of carcasses from cattle having been fed stilbestrol, (3) relate characteristics concerning market quality of beef carcasses to such production factors as growth rate, rations, and feed use, (4) compare moisture and fat content samples from carcasses, (5) learn cooler shrinkage on the carcasses.
An. Husb. 1413

- Mo. Effect of Antemortem Handling During Marketing on Subsequent Carcass Quality of Beef. To study influence of exercise, rest, feeding, and other factors which may produce shock in the live animal and a loss in quality in the resultant beef carcass.
An. Husb. 238
- N. Y.
Cornell Means of Improving the Meat Quality of Slaughter Dairy Cows. Learn effects of estrogen treatments on slaughter dairy cows of advanced age during a 6-8 week feeding period.
An. Husb., Dairy Ind. 112
- S. Car. The Effect of Feeds on Color and Firmness of Beef Fat. To learn (1) effect of green forage and subsequent dry lot feeding on carotene and xanthophyll content (color) of beef fat, color of lean, firmness (iodine number) of beef fat; (2) rate of carotene and xanthophyll depletion during dry lot feeding; (3) rate of change of unsaturated fatty acids (firmness) during dry lot feeding.
An. Husb., Econ. 80
- Tenn. Carcass Value Investigations with Beef. Ascertain possibility of developing methods for objectively evaluating quality factors in beef. Learn effect of consumer acceptance as basis for improvement in methods of beef production and marketing.
An. Husb., Econ. and Rural Soc. 69
- Tenn. Type and Breed as Factors Involving Beef Carcass Characteristics and Consumer Acceptance. To (1) relate carcass characteristics of beef and dairy animals varying greatly in conformation to consumer preferences and acceptance, (2) compare value of retail cuts from experimental animals as evaluated at the retail level with the characteristics of carcasses from which they came as evaluated in detail at the wholesale level, (3) use the information in objectives 1 and 2 for developing improved standards for evaluating conformation in beef breeding stock, and (4) determine the necessary inputs per pound of edible meat produced by animals varying greatly in conformation.
An. Husb., Econ. and Rural Soc. 70, coop. ARS

Texas Characterization of Carcass Quality and Eating Quality of Individual Animals. To (1) determine carcass characteristics of individual animals of known history and breeding as part of effort to develop beef cattle yielding meat of superior market qualities, and (2) characterize eating quality of meat from individual animals of known history as part of effort to develop beef cattle yielding meat of superior eating qualities.

An. Husb., Home Econ. 941 (S-10)

Va. Processing and Merchandising Meats from Animals Produced Under Virginia Farm Conditions. Investigate procedure and develop ways of processing and merchandising meats from cattle and sheep produced under Virginia farm conditions, hogs fed, managed, and bred so as to increase ratio of lean to fat in carcass. Devise means of estimating carcass value in live animals, and develop procedures for more precise evaluation of carcasses from meat animals in breeding, feeding, and management research. Investigate methods of curing and storing home meat supplies.

An. Husb., Home Econ., Econ. and Rural Soc. 8455

Va. The Effect of Different Methods of Feeding on the Patterns of Growth and Carcass Composition of Cattle and the Evaluation of Techniques and the Development of New Techniques for Studying Carcass Composition. To learn carcass composition by dissection and chemical analysis of cattle on different methods of feeding at various ages and weights. Evaluate and develop techniques for use in live animal indicative of carcass composition--live animal probe as a measure of fatness, body water in vivo and its relationship to carcass composition.

An. Husb. 8456

Wash. Factors Influencing the Desirability and Nutrient Content of Meat and Meat Animals for Human Consumption. To determine effects of (1) genetics, nutrition, and other factors on carcass quality of meat animals and on quality and nutrient content of meat; and (2) storage, processing, and preservation on quality, nutrient content, physical structure, and economic value of meat and meat products.

An. Husb. 1161

REGIONAL PROJECTS

NC-1

Improvement of Beef Cattle Through Breeding Methods.

To (1) determine the characters important in beef production and their relative value, (2) develop methods of measurement of important characters and determine their heritability values, (3) determine the relationship of performance characters, such as body size, conformation, rate of gain, and efficiency of gain, to net value, (4) determine the effectiveness of selection, inbreeding, cross-breeding, line-crossing and out-breeding -- and combinations of these -- as a means of producing more productive beef cattle, (5) determine the productiveness of existing stocks of beef cattle and their adaptability in various areas under different systems of management, (6) determine the mode of inheritance of defects, lethals, and semi-lethals, and methods of controlling same, and (7) develop practical procedures which can be used to breed beef cattle capable of high production efficiency and superior carcass qualities.

Cooperating stations: Federal-grant projects - Ill., Iowa, Kans., Mich., Mo., Nebr., Ohio, Okla., S. Dak., and Wis.

NC-25

Factors Affecting the Utilization of Feed by Ruminants.

To improve the utilization of roughages by ruminants, with emphasis upon the utilization of the carbohydrate fraction.

Cooperating stations: Federal-grant projects - Ill., Kans., Mich., Minn., Mo., Nebr., and Ohio

NC-27

Causes and Control of Bloat in Ruminants.

To (1) determine the physical and chemical characteristics of alfalfa and ladino clover and fattening rations associated with bloat, (2) determine the physical and chemical characteristics of rumen ingesta from normal and bloated animals, (3) study the physiologic responses of ruminants to bloat-producing feeds, chemicals, and procedures, and (4) develop and elucidate measures for the control of bloat.

Cooperating stations: Federal-grant projects - Iowa, Mich., Minn., and Ohio. Non-Federal - S. Dak.

NE-24

The Nutritive Evaluation of Forages. To (1) evaluate various forages grown under known conditions and harvested at specific stages of maturity by determining digestible protein and digestible energy; (2) develop methods for the nutritive evaluation of forages these to include the use of small animals and chemical analyses; (3) conduct animal production trials simultaneously insofar as possible.

Cooperating stations: Del., Md., Mass., N. H., N. J., N. Y. (Cornell), Pa., and R. I.

S-10

The Improvement of Beef Cattle for the Southern Region through Breeding Methods. To (1) develop breeding methods, selection criteria, and procedures which will result in beef cattle capable of higher productive efficiency and superior market qualities of product, (2) develop beef cattle with higher reproductive efficiency, greater longevity, and other aspects of lifetime productive efficiency, (3) develop beef cattle especially adapted to conditions in various environments of the region, (4) explore the usefulness of systems of breeding, as a. Inbreeding, b. Crossbreeding, c. Outbreeding, d. Combinations of these to accomplish objectives 1, 2, and 3, and (5) study productiveness of existing or introduced stocks of beef cattle.

Cooperating stations: Federal-grant projects - Ala., Ark., Ga., Ky., La., Md., Miss., N. Car., S. Car., Tenn., Texas, and Va. Non-Federal - Fla.

W-1

The Improvement of Beef Cattle through the Application of Breeding Methods. (1) To develop lines of established beef cattle breeds that will be useful in the improvement of economically important characteristics such as weaning weight, rate of gain, economy of gain, carcass composition, fertility, and longevity. (2) To develop selection criteria and selection and breeding techniques which will be effective in the derivation of productive lines of beef cattle. (3) To study the inheritance of specific genes and factor interactions. (4) To determine the genetic causes of decline in vigor, size, fertility, and other characteristics of inbred lines that have been or may be established. (5) To study the adaptation of lines of beef cattle of known genetic merit to new environments. (6) To introduce and test new or derived breeds or types of beef cattle.

Cooperating stations: Federal-grant projects - Ariz., Calif., Colo., Hawaii, Idaho, Mont., Nev., N. Mex., Ore., Utah, Wash., and Wyo.

W-34

Range Livestock Nutrition. To determine the quantitative and qualitative nutritive value of range forage consumed in terms of chemical analysis, botanical classification, soil, site, stage of maturity, season, drouth, and digestibility relating these factors to reproductive performance, growth, and market value of range cattle and sheep.

Cooperating stations: Federal-grant projects - Calif., Colo., Idaho, Mont., Nev., N. Mex., Ore., Utah, and Wyo.

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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS
NOVEMBER 1955

SHEEP AND GOATS

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State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

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CURRENT SERIAL RECORDS

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

SHEEP and GOATS

Breeding

- Ark. The Development and Study of Inbred Lines of Sheep, With Respect to Their Behavior in Line Crosses. To (1) breed improved strains of sheep within present purebred breeds that are better adapted to conditions in Arkansas than are purebred sheep now available, and (2) test and select for general and specific combining ability of the strains developed.
An. Ind. and Vet. Sci. 332,(S-29)
- Calif. Qualitative and Quantitative Inheritance in Animals. To study (1) inheritance of differences in growth and conformation and relate this study to carcass yield and dressing percent, (2) effect of genetic and environmental factors on milk and butter-fat yield in dairy cattle, (3) inheritance of wool characteristics, (4) resistance and susceptibility to parasites and disease, (5) effects of inbreeding upon size, vigor, fecundity, production, and performance, (6) gene frequencies related to specific gene effects in various breeds, and (7) relation between gene and character.
An. Husb. 939
- Fla. Production of Early Spring Lambs in Florida. To determine the effects of breeding, shearing of ewes prior to breeding season, night mating, and selection for early lambing as means of producing an early spring lamb crop.
An. Husb. and Nutr. 740
- Ga. The Relative Productive Value of Various Crossbreeding Systems for Use with Livestock. To learn (1) productive value of crosses and rotational breeding systems, (2) how single and double crosses compare, and comparison with a random-bred population, (3) comparison of 2, 3, and 4 lines or populations used in a rotational program, with single and double crosses, and with a random-bred population, (4) how many different populations should be used in a rotational program to get maximum economic performance, (5) how performance of a rotation can be predicted from lines performance or single cross performance. Mice used as test animals.
An. Husb. 91
- Idaho A Study of Systems of Breeding Sheep for the Development of Superior Strains. To (1) study methods of sheep improvement through breeding, and (2) obtain data to be used in developing indices, and (3) develop superior and better adapted strains through selective breeding and record of performance testing.
An. Husb. 30, Coop. Western Sheep Branch Laby, ARS

- Ill. Effects of Intensity of Selection Under Different Mating Systems. To determine how different intensities of selection affect degree of heterozygosity within populations inbred at different rates.
 Animal Science 1180
- Ky. Selective Breeding for Earlier Lambing in Purebred Southdown Sheep. Selective breeding for early lambing in an attempt to develop strains or lines with higher reproductive efficiency during late summer.
 An. Ind. 91, (S-29)
- Miss. Selection for Early Lambing. To (1) determine effectiveness of selection on changing average lambing date in a flock of heterogeneous ewes, including selection of ewes on basis of age at puberty, and selection of rams on basis of progeny tests of dams, and (2) study age at puberty in both sexes, its heritability, its importance and possible relationship to early lambing.
 An. Husb. PE-5
- Mont. Improvement of Mutton Type and Wool Characteristics of Rambouillets Through Selection and Breeding. To conduct a breeding program with Rambouillet sheep to improve their body conformation and lamb production and increase quality and quantity of clean wool.
 An. Ind. and Range Mgt. 80, M.S. 710, Coop. Western Sheep Br. Lab., ARS
- N. Mex. Introduction of Variations in Uniform Populations to Give Increased Possibilities for Selection of Better Producing Sheep. To (1) compare introduction through sire of extreme variations into uniform lines of low and high producing fine wool ewes, (2) compare first objective with use of high producing fine wool sires of same line as ewes on low and high producing fine wool ewes, and (3) determine which method will give greatest production of one half blood or fine wool and most lamb production.
 An. Husb. 26
- N. Mex. Genetic Studies on Economic Characters in Sheep. To determine type of inheritance involved in expression of certain designated characteristics in sheep, involving studies to determine (1) number of genes involved with expression of each character, (2) presence or absence of sex linkage, (3) presence or absence of autosomal linkage, and (4) type of genetic variation.
 An. Husb. 13

- N. Mex. Mature and Lifetime Records as Guides for Wool Production and Body Development in Sheep. To determine (1) age at which sheep are mature under environmental conditions found in N. M., (2) variations in amount of wool and body development at different ages and under different environmental conditions, (3) measurements of wool and body and develop one or combinations into a formula to give more reliable estimates of lifetime production of wool and body, and (4) how many years are needed to give a good measure of lifetime production under different environmental conditions.
An. Husb. 14
- Nev. The Improvement of Sheep for Nevada Range Through Development and Crossing of Inbred Lines. Develop through rapid inbreeding a number of small inbred lines of sheep from unrelated sources and test lines through top crosses on unrelated stock and crosses with other lines of sheep.
An. Husb. 11, Coop. Western Sheep Br. Lab., ARS
- Nev. Recurrent Selection of Mutton Type Sires for Use on Fine Wool Type Range Ewes. Learn value of recurrent selection in developing mutton type sires for use on fine wool type range ewes.
An. Husb. 13, Coop. Western Sheep Br. Lab., ARS
- N. C. Development of a Breed of Sheep Adapted to Eastern North Carolina. To develop a light-faced hornless breed of sheep that will produce, in eastern North Carolina, marketable lambs of desirable quality by or before April 15, and have as much merit as possible in other important respects.
An. Ind. 56
- N. Dak. A Study of the Effects of Selection for Crossing Ability in Two Lines of a Single Breed. To (1) study combining ability of two lines of Columbia sheep, one superior in body conformation and the other in wool production, (2) improve crossing ability of lines by selection based on performance of line-cross progeny, and (3) evaluate line-cross ewes as possible material for creating new lines.
An. Husb., Vet. Sci. 128B
- Ohio Types of Sheep and Systems of Breeding for Market Lamb Production. To (1) determine productive value, range of adaptation, and breeding service use of F₁ Columbia x Merino ewes as a new eastern type of commercial ewe for grass-fat lamb production, (2) determine same for 3-breed-cross progeny from above ewes as commercial ewes, and (3) study possibility of three-breed rotation crossing and ascertain advantages and disadvantages of such a system of breeding in commercial sheep production.
An. Sci. 8

Oreg. Improvement of Sheep Through the Application of Breeding Methods.---2. Compare Progeny Testing with Inbreeding and Conversion of Lines as Methods of Sheep Improvement. 3. Comparison of Improvement That Can Be Made in a Closed Breeding Flock Compared With That in an Open Breeding Flock. 4. Inheritance of Characters of Economic Importance in Sheep. 2. To (a) develop superior lines of purebred sheep possessing sufficient homozygosity to stamp their characteristics on their offspring when used to improve sheep in breeders' hands; (b) compare relative efficiency of progeny testing and mild inbreeding with close inbreeding and converging of sub-lines at methods of improvement; (c) determine heritabilities of characters of economic importance; and (d) develop selection index with proper balance for mutton and wool characteristics considering relative economic importance and heritability of these characteristics. 3. To determine progress that can be made by selection for productive characteristics in closed flock as compared with progress made through selection in an open flock. 4. To determine inheritance of (a) black fibers; (b) fertility, particularly early vs. late lambing tendencies; (c) turned-in eyelids; (d) scurs; and (e) anatomical or physiological abnormalities of economic importance that may crop out.

An. Husb. 157-2, 3, 4

S. C. Some Factors Affecting Breeding Performance and Early Lambing in Sheep. To determine effect of various factors on breeding performance and early lamb production including selection, hormones, light, temperature, light and temperature.

An. Husb., Dairy Husb. 69 (S-29) . . .

Tenn. Sheep Production for Tennessee. A. Replacement Ewes for Tennessee Sheep Flocks. B. Improvement of the Producing Ability of Sheep. To (1) compare longevity and lifetime performance of ewes from different sources as replacements for Tennessee flocks for spring lamb production, and (2) investigate effect of performance and progeny testing in improving productivity of existing breeds in such traits as prolificacy, per cent of lamb crop raised, weaning weight of lambs, yearling body weight and type, fleece weight and quality, etc.

An. Husb. 41

Texas Comparison of Wool Production and Lamb Production by Fine-Wool Sheep of Different Strains or Breeding. To learn (1 and 2) wool production of sheep produced under project 404 as compared with Rambouillets of other sources; if crossing of 404 strain with non-related Rambouillets affects wool production. To compare (3 and 4) lamb production of 404 strain with Rambouillets of other sources; lamb production of offsprings of non-related Rambouillet ewes when crossed with 404 strain, with ewes not crossed with 404 strain.

An. Husb. 404

- Texas Breeding Fine-Fiber Mohair Goats. Transfer genes for fineness of fibers and genes for persistence of fineness to old age, which are present in many non-Angora goats, to Angoras.
An. Husb. 448
- Texas Development of Short-Tailed Domestic Sheep For Texas. To develop short-tailed sheep for use on Texas farms, sheep to be equal to or better than present adapted types with respect to wool and mutton.
An. Husb. 449
- Texas Improvement of Sheep Through the Selection of Performance-Tested and Progeny-Tested Breeding Animals. To (1) evaluate lambs for rate of gain, fleece production and mutton conformation under the same conditions, (2) determine heritability of rate of gain, staple length, clean wool production and mutton conformation under standard conditions, and (3) evaluation of sires of lambs tested, as related to further use of these sires.
An. Husb. 687
- Utah Development of Open-Faced Rambouillet Sheep of High Productivity. To (1) develop open-faced Rambouillet sheep, (2) compare wool and lamb production of open-faced and closed-face Rambouillets maintained under similar environmental conditions, and (3) develop and make available for Utah sheep producers an improved strain of Rambouillet sheep.
An. Husb. 407
- Va. Replacement Ewes. To compare western ewes with native ewes for spring lamb production. Test western ewes from different sources in order to ascertain their breeding value for spring lamb production. Compare rams of different breeding as sires of spring lambs.
An. Husb. 8313
- Va. Improvement of Sheep Through Recurrent Selection for Combining Ability. To investigate the effectiveness of the method of recurrent selection for combining ability as a means of developing lines of sheep within a pure breed with superior genetic merit for crossing with a particular type of commercial ewe as measured by the growth rate and carcass quality of the lambs.
An. Husb. 9377, (S-29)
- W.Va. The Relation of Birth Weight Within Breeds to Growth Rate of Purebred Mutton Type Lambs. To determine the relation of birth weight and rate of gain for several breeds.
An. Husb. 50

W. Va.

Breed as a Factor in the Production of Ewes Retained for Flock Replacement and For the Production of Market Lambs and Wool. To compare wool and lamb production of western California ewes of Hampshire x Rambouillet and Suffolk x Rambouillet breeding, with wool and lamb production of their daughters sired by Corriedale, Dorset, and Hampshire purebred rams (1) when dams and daughters are bred as ewe lambs to purebred Southdown rams, (2) when daughters are bred as yearling ewes and older to a ram of same breed as their sire: viz. Corriedale, Dorset, and Hampshire, (3) to obtain information on the selection, development, and mating of native ewe lambs intended for flock replacement, and (4) obtain data on production of market lambs and wool from native ewe lambs resulting from matings of California ewes and Corriedale, Dorset, and Hampshire rams that will permit proper comparison of these breeds when used as sires for production of breeding ewes and for production of market lambs and wool.

An. Husb. 63.

Wyo.

Improvement of Columbia Sheep by Selection, Linebreeding, and Linecrossing. Learn whether diverse lines can be obtained by selection of lines for different traits. Learn effectiveness of selection for one or two traits in a small flock and incidental efforts on other traits. Make crosses between lines to obtain a maximum expression of heterosis as measured by combined lamb and wool production. Obtain further estimates of heritability of gain.

An. Ind. 517

Wyo.

Breeding for Brown Leg Color in Columbia Sheep. To determine in a closed flock of Columbias (1) the mode of inheritance of brown color, (2) the relation, if any, of brown color to economic traits, and (3) the extent to which brown color can be increased by selection.

An. Prod. 595

Wyo.

The Performance of Purebred Wyoming Flocks. To (1) determine by objective measurements staple length, clean fleece weight, and body weight of mature ewes, yearling ewes, and rams of purebred flocks, also weanling weight of lambs and type score, and (2) formulate selection indexes and appropriate corrections for variable factors which influence performance of purebred Wyoming flocks, and through them commercial sheep.

An. Prod. 574

Wyo.

Relationship of Body Capacity of Sheep To Their Productibility of Wool and Lamb. To determine relationship of body capacity to clean fleece weight, body weight, feeding capacity, and lamb production.

An. Prod. 547

Physiology and Biochemistry

A. General

- Calif. Studies On The Energy Transformation in Organisms, Especially in Farm Animals. To study energy transformation in animals as (1) quantitative deficient food, (2) environmental conditions of body size, and (3) utilization of food energy.
An. Ind. 940
- Calif. Physiology of the Domestic Animals. To study the physiology of (1) reproduction, (2) ruminant stomach, and (3) the parathyroid gland as a control mechanism for the Ca level of the blood.
An. Husb. 941
- Calif. Steroid Metabolism in Domestic Animals. Elucidation of fundamental aspects of steroid physiology in domestic animals, especially in ruminants. Development of rational therapeutic measures in endocrine disfunction and/or other metabolic derangements manifested via altered steroid physiology.
An. Ind. 1659
- Minn. Chemical and Biological Studies on Animal Nutrition.
(1) To study the hemagglutinating activity of Soyin, a toxic protein of soybean flour, (2) the mechanism of inhibition of trypsin by various trypsin inhibitors, (3) the biological function of orotic acid, (4) mechanism of the toxicity of trichloroethylene-extracted soybean oil meal, (5) energy transformation of enzyme reactions, (6) effect of amino acid diets on liver lipids, and (7) the composition of rats' milk.
Biochem. 1506, Coop. Nat'l Science Foundation, ARS
- Minn. The Effect of Maternal Nutrition on Development, Growth and Performance of the Young. Small laboratory animals will be used for initial studies. Dietary restrictions of mothers in caloric, protein, mineral and vitamin intake, as well as production of acute temporary vitamin deficiencies by means of vitamin analogues, will be used as experimental techniques. The young will be studied with respect to birth weight, anatomical malformations, vitamin content of tissues, viability, growth, and development. Similar observations will be made with animals fed the best diets that can be devised. Chemical studies will be made on the blood and tissues of mothers and young to study relation between maternal and fetal composition under various conditions. With young born to mothers on restricted diets, a study will be made on the effect of optimum vs. suboptimum nutrition on growth and performance. This may indicate whether deleterious effects of prenatal nutrition can be corrected later.
Biochem. 1514

B. Reproduction

- Ga. Studies on Ram and Ewe Fertility with a Spring-Summer Breeding Program. To (1) study fertility of rams by means of semen evaluation and settling of ewes, (2) study ewe's estrual cycles and settling by ram, (3) develop practical management system to obtain acceptable breeding efficiency during spring-summer months, and (4) select animals to improve breeding efficiency during summer.
An. Husb. 39
- Ill. Physiology of Reproduction of Sheep. To (1) study normal variability in reproductive pattern of sheep, (2) measure and compare hormonal and ovarian changes during anestrus and estrus periods, and (3) determine effect of hormones on reproductive performance of anestrus sheep.
An. Sci. 20-375
- Ill. The Effect of Feeding The Soybean Plant or Its Fractions on Animal Reproduction, Growth, Lactation, and Aging. To (1) learn cause for impaired reproduction and other physiological failures in female rabbit fed a diet composed of 49.5 parts soybean hay, 49.5 parts of ground wheat and 1 part NaCl, (2) extend study to dairy cattle and goats to learn reasons why soybean forage as a nutrient source has lost favor with dairymen in Illinois, (3) study soybean dietary factors as related to vitamins, hormones, and body metabolism.
An. Sci. 35-313
- Ind. The Influence of Light and Temperature on the Breeding Season of Sheep. To (1) determine effects of light and temperature on estrus, ovulation, fertilization, and pregnancy in sheep, and (2) observe other physiological effects of alteration of environment.
An. Husb., Agr. Eng. 728
- Kans. Use of Management Techniques and Hormones in Ewes for Controlling the Time, Rate, and Regularity of Lambing. Learn effect of environmental and genetic influences upon time, rate, and regularity of lambing and management methods which will improve lambing performance of ewes.
An. Husb. 441
- Ky. Improving Conception in Kentucky Purebred and in Commercial Ewes. To (1) increase conception rate in both purebred and commercial ewes, (2) advance conception dates, especially in purebred ewes, (3) reduce duration of lambing period, and (4) increase incidence of multiple births, especially in commercial ewes.
An. Ind. 19

- Mich. The Thyroid Secretion Rate of Sheep as Affected by Seasons, Age, Breed, Sex, Pregnancy, and Lactation. To (1) make the following comparisons of thyroid activity: 3 breed comparisons, 1 sex comparison, 1 age comparison, 1 comparison between dry ewes and ewes in pregnancy and lactation, and seasonal variations, and (3) study effect of thyroid activity on semen quality in rams.
An. Husb., Chem. 91
- Minn. A Study of the Physiology of Reproduction With Special Emphasis on Degrees of Fertility. To (1) study normal prenatal development in pig that is already well advanced, (2) study females that give evidence of being in process of resorbing their fetuses with the objective of finding underlying causes, and (3) determine causes of failure of both males and females to mate and produce offspring.
An. Husb. 1409
- Minn. A Study of the Use of Endocrines As A Means of Increasing and Maintaining Levels of Fertility in the Male. To (1) determine causes of low fertility in problem bulls used in artificial insemination and to provide methods to increase their fertility levels; (2) develop management, feeding and semen collection methods to improve semen production in bulls for artificial insemination; (3) develop improvements in techniques and equipment for inseminating cows; and (4) develop satisfactory lab tests on semen samples to measure relative degree of fertility in bulls.
An. Husb., Dairy Husb., Vet. Sci. 1411
- Miss. A Study of the Factors Affecting Date of Lambing. To determine (1) the importance and causes of anestrus and develop methods to terminate this condition in a way that a successful pregnancy can be initiated; (2) reproductive performance of the ewe following the period of anestrus; and (3) reproductive performance of the ram as based on semen quality and ability to settle ewes.
An. Husb. PE-4 (S-29)
- Mo. Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To (1) make a thorough study of the chemistry and/or biochemistry of male and female germ cells in order to gain knowledge which is needed as a basis for future investigations involving: a. ova and spermatozoa storage and preservation, b. artificial insemination, c. ova transfer, d. fertilization mechanism, and e. chemistry and physiology of gene action; (2) investigate the enzyme systems and metabolic activities of male and female gametes, the results of these studies being basic requirements for further work on storage.

Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding - continued

media, cold shock phenomenon of spermatozoa, low temperature storage of ova and spermatozoa, and possibly to other reproductive processes or activities affecting fertility and litter size; (3) characterize and isolate certain factors present in egg yolk, boiled milk, chick embryos, and other biological tissues that aid in preservation of the viability of spermatozoa of farm animals and protect them against a number of adverse environmental conditions including sudden lowering of temperature; and (4) make further investigations into the physical requirements of male and female germ cells.

An. Husb. 81

Ohio

Influence of Ladino Clover and Birdsfoot Trefoil Pasture on Reproductive Efficiency in Sheep. To (1) compare birdsfoot trefoil and ladino clover as principal legume for permanent sheep pasture, and (2) determine effect of the two legumes on gain efficiency, animal health, and reproductive efficiency.

An. Sci., Agron., Vet. Med. 34-7

Oregon

The Measurement and Improvement of Fertility in Farm Animals--
1. The Evaluation of Semen Production and Libido in the Male Farm Animals. 2. The Role of Hormones and Nutrition on Gamete Production, Prenatal Survival, Mating Response, and the Estrual Cycle.
3. The Effect of Breed, Season, Age, and Management Upon Fertility.
To determine (1) effect of chemical, physical and bacteriological factors upon semen quality and fertility, and (2) effect of age and frequency of service on semen production and quality; (3) effect of the hormones, Progesterone, F.S.H., L.H., and Testosterone, on gamete production, fertilization rate, prenatal survival, and mating response; (4) concurrence of estrus and ovulation in the postpartum female and its relation to subsequent fertility; (5) factors influencing age at puberty and relationship of age at puberty to subsequent fertility, and (6) effect of breed differences on breeding behavior and fertility in farm animals and the relationship of season to breed response.

An. Husb. 155-1, 2, 3.

Texas

A Study of the Maturation Process in the Ova of Mammals.
To determine (1) normal maturation process of egg nucleus in the cow, ewe, sow, mare, and mule; (2) ascertain maturation response of egg nucleus during induced ovulation in both the follicular and luteal phase of the cycle; and (3) obtain data for cause of infertility of mammalian eggs.

An. Husb. 854

Wis. Reproduction Studies With Sheep. To (1) learn for early breeding season phases of reproductive process where failure may occur, (2) identify cause of this failure in terms of genetic stock, nutritional, management or disease state of animal, (3) develop research to correct findings of above, (4) learn influence of reproductive hormones on growth and interrelations of growth and fattening with reproductive performance.

An. Husb. 959

C. Rumen Function

Ill. Studies on Protein and Carbohydrate Metabolism in Ruminants, Especially as Affected by Rumen Microorganisms. Increase efficiencies in those metabolic processes of rumen microorganisms by which nutritional demands of ruminants may be satisfied.
Dairy Sci. 35-315, (NC-25)

Iowa Increasing the Usefulness of Forage Crops and High-Cellulose Roughages by Improved Rumen Function (Zymo-Chemistry) in Beef Cattle and Sheep. To (1) increase usefulness of forage crops and high-cellulose roughages through improved rumen function or improved bacterial digestion within rumen of beef cattle and sheep; and (2) work for better nutrition in cattle and sheep resulting from improved rumen function especially in those animals subsisting largely upon low-grade roughages and forages.
An. Husb., Dairy Ind., Chem. 1208

Kans. A Study of the Intermediary Metabolism of Rumen Microorganisms With Reference to the Formation of End Products From The Carbohydrates of Roughage. Elucidate mechanisms in formation of end products, as fatty acids, from the carbohydrates of roughage. Study inter-relationship of apparently nonuseful end product methane with production of useful carbonaceous end products. Isolate enzyme systems capable of carrying on one step reactions found in carbohydrate fermentation.
Bact., Dairy Husb., An.Husb. 425, (NC-25)

Kans. Interrelationships of Feedstuffs Combinations, Appetite, Rumen Function, Digestibility, and Rumen Microorganisms in Roughage Utilization. To determine (1) the interrelationships of feedstuffs combinations, appetite, rumen function, digestibility, and rumen microorganisms in order to explain differences among animals in their ability to utilize roughage, and (2) the parts played by rumen microorganisms and combinations of feedstuffs in the efficiency of roughage utilization.
Dairy Husb., An. Husb. 455

- Mich. The Chemical Determination of the Carbohydrate Fraction in Various Forage Crops and Their Isolation and Identification. (1) To investigate the suitability of existing chemical methods for determining the various carbohydrates in forage crops and devise new methods whenever necessary. (2) To make a systematic chemical study of the carbohydrates in forage crops consumed by ruminants. (3) To investigate environmental conditions which influence the composition of forages. (4) To conduct digestion trials on the forages under investigation whenever feasible.
Chem., Dairy 811, (NC-25)
- Minn. Investigations of the Carbohydrates of Forage Crops, With Special Emphasis on the Hemicelluloses. To investigate chemical nature and structure of carbohydrates of forage with emphasis as above.
Biochem., Dairy Husb., An. Husb. 1518, (NC-25)
- Mo. Rumen Culture. To (1) set up in lab. an artificial rumen with conditions simulating those found in natural rumen; (2) study by quantitative chemical analysis the changes that occur in a ration as it is fermented in artificial rumen; (3) study methods of preserving rumen organisms so that they will be available for inoculation of artificial rumen; and (4) study effects of these preserved rumen microorganisms on a ruminant.
Chem., Vet. Med. 152-a
- Mo. Ruminant Digestion. a. Development and Testing of Techniques for the Study of Ruminant Digestion. b. Chemical Compounds Which Affect the Digestion of Roughages by Ruminants. c. An Attempt to Establish Rumen Flora by Inoculation. (1) To develop surgical, chemical, and bacteriological techniques which can be routinely applied to the study of ruminant digestion; (2) To determine the effect of food nutrients, antibiotics, and other chemicals on rumen flora and fauna, and the optimum level and source of soluble carbohydrates for maximum cellulose use in sheep; and (3) To inoculate animals, with a functioning rumen flora, at the time of major ration changes and evaluate the subsequent performance of the animals and, to determine effect of inoculating lambs in early life on subsequent performance.
An. Husb., Chem., Dairy Husb., Vet. Med. 168-a, b, c.
- Mo. Nutrients in Grains, in Forage Crops, and in Rations of Ruminants Before and After Fermentation in an Artificial Rumen by Rumen Microorganisms. To (1) compare nutritional value of newer forages; (2) obtain further data on effect of fertilizer treatments on nutritional properties of plant; (3) study amino acid content of practical rations which support rapid growth of chicks and find what amino acids are deficient in feedstuffs which permit only slow growth of poultry; (4) study improvement of bovine and ovine rations, in vitamin and amino acid content, during fermentation with rumen microorganisms in an artificial

Nutrients in Grains, etc. - continued

rumen;-- i. to study synthesis of essential amino acids in low protein rations containing urea; and ii. to find whether nutritional properties of cottonseed oil meal can be improved by this procedure; and (5) determine percentage of zein protein in crude protein of 55 samples of exotic corn grains.

Chem., Field Crops 212-a

Mo. Changes in the Physical Structure of Roughages During Growth and Digestion. To note changes in physical structure, as indicated by X-ray diffraction and electron microscopy of wheat and lespedeza during their growth and digestion by rumen microorganisms.

An. Husb. 250, (NC-25)

N. Dak. Roughage Utilization by Ruminants. To (1) study by rumen fistula and digestion trials, value of poor quality roughage for sheep; (2) compare ability of cattle and sheep to use good and poor roughages; (3) study feasibility of altering rumen microflora of sheep by inoculating with rumen contents from cattle; (4) determine why sheep do not consume poor quality roughage as do cattle and if poor quality roughage is force fed, if it would be digested; and (5) find methods of making greater use of roughage common to northern great plains.

An. Ind. 19

Nebr. The Mechanism of Digestion of Polysaccharides From Roughages by Microorganisms of the Rumen. Identification of products of digestion of polysaccharides from roughages by bacteria from rumen. Investigation of mechanism of utilization of degradation products of polysaccharides.

Dairy Husb. 491, (NC-25)

Ohio Digestion Studies.--7. Factors Affecting the Utilization of Feeds by Ruminants. To (1) determine factors affecting roughage digestion in ruminants, using an artificial rumen technique; (2) determine by in vitro methods factors in non-protein nitrogen utilization by rumen microorganisms; and (3) apply and further determine factors important in rumen function, using cattle experiments directed towards greater efficiency of utilization of low grade roughages.

An. Sci. 33

- Ohio The In Vitro Digestibility of Cellulose From Various Sources and the Effect of Lignification Thereon. To (1) learn the digestibility (in vitro) of cellulose and cellulose-containing crude fiber fractions isolated from feedstuffs (corn cobs, oat hulls, wheat bran, alfalfa leaves and stems, timothy, and straws), (2) try to assess effect of lignification of materials on digestibility of cellulose in these materials.
An. Sci. 132 (NC-25)
- Okla. The Effect of Steroids on Microbial Carbohydrate Utilization. To determine (1) effect of cholesterol, estradiol, stilbestrol, estrone, testosterone, progesteron, vitamin D, and cortisone in respect to stimulation or inhibition of microbial growth and use of glucose, maltose, sucrose, starch, (2) if the microorganisms under observation are capable of using any of the steroids listed as a sole source of carbon for growth and reproduction, and (3) if the steroids affect extracellular enzyme production.
Vet. Med. 892
- Va. The Isolation, Propagation, and Nutrition Requirements of Cellulose-Decomposing Bacteria Found in the Rumen of Cattle That Are Consuming High-Roughage Feeds.—To (1) isolate cellulose-decomposing bacteria from rumen of cattle and design methods for propagation in quantity; and (2) investigate nutritional requirements of cellulose-decomposing bacteria as to carbon, N, minerals, and unidentified growth factors.
Biochem. and Nutrition , An. Husb. Dairy Husb., Biol. 8438
- Va. The Effect of Various Protein and Non-Protein Nitrogen Sources on Protein Assimilation by Rumen Microorganisms. To (1) determine if non-protein N of types used in cattle feeds suppresses decomposition of feed protein by rumen microorganisms; and (2) compare proteins of forage crop stems and leaves, seed proteins, and animal proteins of high biological values of N sources in protein synthesis by rumen microorganisms.
Biochem. and Nutr., An. Husb. , Dairy Husb., Biol. 8439
- D. Ruminant Bloat
- Ind. Biochemical Aspects of Ruminant Bloat. To learn (1) what constituents of feeds and forages increase the incidence of bloat, and (2) what biochemical compounds and reactions are involved.
Vet. Sci., Biochem., Agron. 828
- Iowa Physical and Chemical Aspects of Bloat. To (1) study effect of dietary components and therapeutic agents on physical and chemical characteristics of rumen ingesta; (2) determine relation of dietary characteristics to incidence of bloat; (3) determine various physical and chemical characteristics of rumen ingesta and of blood and other tissues from bloated animals; and (5) determine relation of physical characteristics of animal to incidence of bloat.
Med.
An. Husb., Dairy Ind., Chem., Vet., Agron. 1267 (NC-27)

- Mich. Investigations of the Causes and Methods of Control of Frothy Bloat. To (1) determine the chemical and physical properties of saliva, (2) determine the relationship of saliva and its components to frothy bloat, (3) determine the effect of rations on the amount of froth produced, and (4) determine the role of microorganisms in the production and stabilization of froth in the rumen.
Dairy, Chem. 812, (NC-27)
- Minn. Bloat-Producing Mechanisms in Ruminants. To (1) clarify poorly understood motor control mechanisms in the ruminant stomach, especially the forestomachs, (2) develop a bioassay procedure for toxic, bloat-producing legume extracts.
An. Husb., Dairy Husb., Vet. Sci. 2624, (NC-27)
- Mo. Pasture Improvement. d. The Incidence of Bloat and Methods for its Control. To determine (1) under what conditions pastures produce a high incidence of bloat, and (2) if simple methods of management can be used to control it.
An. Husb. 154-d
- Ohio Bloat in Ruminants. 1. Causes. To investigate causes of bloat based on clinical observations, examination of rumen samples for hydroscopic properties, volatile fatty acid content and microorganism variations and examination of blood concentrations of nitrogenous constituents.
Vet. Sci., Dairy, An. Sci., Agron. 123, (NC-27)

Nutrition and Management

A. Pastures and Forages

- Ariz. The Evaluation and Utilization of Low Quality Roughages as Feeds for Livestock in Arizona. To evaluate by chemical analyses, digestibility trials, and palatability studies, roughages and by-product feeds present in Arizona and which possess nutrient deficiencies and palatability limitations. Learn effective and economical methods for efficient utilization of these low quality roughages.
An. Husb., Dairy Husb., Agron. and Range Mgt. 388
- Ark. The Evaluation of Forage and Other Nutrients for Sheep. To (1) evaluate forage commonly available for sheep production in South on which adequate experimental information is lacking, (2) study effects of certain micro-nutrients on utilization of forage materials, (3) study influence of certain nitrogen concentrates on efficiency of roughage utilization by sheep.
An. Ind. & Vet. Sci. 400

- Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin and combinations) and fibrous feeds, by rats, pigs, cattle and sheep through the use of ad libitum and paired feedings, N balance, and digestibility; (2) make chemical studies on methods of analysis and isolation of fibers; and (3) apply findings to the utilization of forage.
An. Husb., Eng., Agron. 1569
- Calif. Nutritive Value of Specific Range Forage Species as Influenced by Seasons, Fertilization and Management. To learn (1) techniques for measuring consumption, a. esophogostomy, b. clipping, c. hand selection, d. reference substances-lignin, chromic oxide, chromogens, (2) nutritive value of specific range species; a. chemical composition, b. digestibility, c. mineral availability, d. fiber utilization.
An. Ind., Agron. 1670, Coop. FS
- Del. Nutritive Evaluation of Forages. To determine (1) yield of digestible nutrients of forage crops cut at various stages of maturity and produced under different management procedures, (2) yield of digestible nutrients when various forages are grazed or when various systems of grazing are used, (3) if the rabbit can be used to test the digestibility of forages which are produced to be consumed by other species.
Agron. and Eng. 132-532, (NE-24)
- Fla. Herbage Composition and Animal Response as Influenced by Pasture Management. To evaluate nutritional qualities of herbage grown under specified conditions in terms of animal response and of the composition of the herbage.
An. Husb. & Nutr. 356
- Ga. An Evaluation of the Production of Sheep in North Georgia Under Different Feeding Systems. To determine (1) value of supplemental feeding in production of sheep on perennial pasture, (2) if internal parasite infestation is or may be a problem under prevailing conditions, and (3) economic aspects of sheep production in mountain area of Georgia.
An. Husb., Agron. 40, Coop. TVA
- Ill. The Study of Soiling Versus Grazing as They Affect Market Lamb Production. Study above as they affect rapidity of finish of market lambs, economy of production, parasitism, pasture life, species change, and forage production.
Dix. Spgs. 40-328
- Kans. Fundamental Nutrition Studies of Sorghum Roughages and Grains.--II. A Study of the Digestibility of Sorghum Silage. To determine the coefficients of digestibility of sorghum silage when fed alone and in conjunction with a high-protein concentrate.
An. Husb., Chem. 222-2

- 15 -
- Kans. Nutritive Value of Forages as Affected by Soil and Climatic Differences. To study (1) differences in nutritive value of forages as affected by variations in fertility and other characteristics of soils, and (2) effects of climatic factors.
Dairy Husb. 430
- Ky. A Comparison of Various Grass Silages as Roughages for Pregnant Ewes. To determine relative merits of grass silages from Kentucky 31 fescue and from a mixture of Kentucky 31 fescue and ladino clover.
An. Ind. 18
- Ky. Factors Influencing Low Quality Roughage Digestion in Sheep. To determine effect of adding the following substances to rations of low quality roughages in promoting maximum roughage digestion in sheep: nitrogen, readily available carbohydrates, inorganic materials and other factors.
An. Ind. 69
- Mass. Quality in Roughage. I. A Study of the Factors Which Influence Composition, Palatability, and Value for Milk Production of Roughages (Hay and Silage) Grown in Northeastern United States. II. The Nutritive Evaluation of Forage by Means of Milk Production Trials and Laboratory Tests. (1) To determine the value for milk production of forages grown for that purpose in this region, with special emphasis on those crops or combinations of crops of relatively recent introduction in comparison with others that are more or less indigenous. (2) To determine the effect on nutritive value of forage crops (both those recently introduced and the indigenous species and combinations) of increased use of fertilizers and improved methods of harvesting and storing. (3) To correlate the results of milk production trials of these crops with chemical analyses and other potential indicators of forage quality in the search for a relatively simple test that might be used as a criterion for quickly judging the nutritive value of forages. (4) To determine the value for milk production of forages grown for the purpose in this region, and to correlate the results of the production trials with chemical analyses and a rapid and simple test of forage quality already developed in our laboratory.
An. Husb., Chem. 1038, (NE-24)
- Md. Nutritive Evaluation of Forages. To (1) determine nutritive value of forages fed to dairy cattle as affected by stage of maturity at harvesting, fertilizing, and management practices, (2) evaluate different methods of harvesting and preserving forages, (3) determine total yield of nutrient material per unit of land from forages subjected to the above management procedures, and (4) aid in development of improved chemical techniques for evaluation of forages.
An. Husb., Agron. G-17, (NE-24)

- Miss. A Study of the Cause and Prevention of Grass Tetany in Lactating Ewes Grazing Cereal Forages. To (1) attempt to identify causative agent(s) in grass tetany; and (2) study incidence of grass tetany in ewes grazing oats, ryegrass, and wheat, and study of practical methods of preventing grass tetany.
An. Husb. BE-4
- Mo. Roughage and Pasture in the Production of Late Lambs. To (1) produce choice market lambs without use of concentrates for ewes or lambs, (2) learn nutrient production and sheep carrying capacities of major Missouri pasture crops in each season, (3) recommend suitable forage mixtures for a year-round pasture program for sheep production, and (4) estimate nutrient requirements of pregnant ewes under farm flock conditions in Missouri.
An. Husb. 142
- Mo. Mineral Content of Foods and Feeds Grown in Missouri.--
a. Mineral Content of Lespedeza and Bluegrass Grown in Missouri. To analyze the 70 samples of lespedeza or blue grass and associated soils collected in 1950 and 1951 and make a third collection of these same species and soil from same sites in growing season of 1952 and to analyze them for nitrogen, crude fiber, crude fat, total ash, calcium, molybdenum, cobalt, manganese, zinc, phosphorus, sulfur, chlorine, boron, and iodine.
Chem. 147-a
- Mo. Returns From the Use of Sheep on Small Fertile Irrigated Areas. To learn effect of irrigation and irrigation plus fertilizer on growth and nutrient production of orchard grass, orchard grass-ladino clover, and orchard grass-lespedeza used for sheep production.
An. Husb. 235
- Mo. Forage Poisoning Caused by Drought. To (1) develop a quick chemical test to predict if forage would be toxic to farm animals, (2) learn if the toxicity of forage declines after ensiling, and (3) study physiological effects of high nitrate intake on farm animals and investigate ways of counteracting the effects.
An. Husb., Chem., Vet. Met. 247
- Mo. The Effect of Nitrate in Feedstuffs on the Performance of Sheep and Cattle. To (1) observe effect of feeding forages, grown under conditions which favor high nitrate accumulation, on the rumen function and general performance of sheep & cattle, and (2) learn if effects observed in (1) can be duplicated by adding nitrate to the normal ration of cattle and sheep.
An. Husb. 251

- Mont. The Amino Acid Composition of the Proteins of Montana Grasses. To study (1) methods for extracting proteins from dried grasses, (2) amino acid composition of the proteins of grasses, and (3) effect of age of plant on amino acid composition of the proteins.
Chem. 39, M. S. 738
- Nev. The Nutritive Value of Range Forage and Its Relationship to Reproduction and Growth of Range Livestock as Modified by Nutrient Supplementation. Learn botanical and chemical composition of diet of range livestock as modified by location, season, climate, and management practices with special reference to nutrient deficiencies. Learn effects of seasonal supplementation upon growth, reproduction, blood and body composition during both period of supplementations and subsequent periods in terms of nutrient requirements under range conditions. Study use of range forages as determined by growth, digestibility, metabolism, and body composition studies. Develop techniques for study.
An. Husb., Agron. and Range Mgt. 8, (W-34), Coop. ARS
- N. H. The Nutritive Evaluation of Forage for Dairy Cattle.
(1) Improve and standardize procedures for nutritive evaluation of forages for dairy cattle. (2) Compare values for energy as net, digestible, metabolizable and compare digestible dry matter and total digestible nutrients determined on same forage. (3) Learn effect of stage of maturity and level of N fertilization on nutritive value of certain forages. (4) Learn effect of variables on nutritive value of acre yield. (5) Learn effect of variables on excretion of certain B complex vitamins.
Dairy Husb., An. Husb., Agron. 51, (NE-24)
- N. Mex. The Composition of Range Forage Related to the Requirements of Cattle. Develop monthly and yearly pattern of blood carotene, vitamin A, and inorganic P of breeding cows on representative range land. Learn levels of carotene, vitamin A, and inorganic P in blood of range cows. Correlate carotene and P content of forage consumed with that of blood. Compare and evaluate results of blood test found in winter and spring with present standards and with patterns found for southern New Mexico. Determine the chemical composition and seasonal variation for most important range forage plants in ten representative areas. Learn loss or variation of different nutrients caused by wintering and leaching. Measure available P of soil and its relation to plant P.
An. Husb., Agron. 52, (W-34)
- N. J. Relationship of Time of Cutting to Digestibility of Hay From Alfalfa and Birdsfoot Trefoil. To determine the digestibility of (1) alfalfa hay cut during the 1/10, 1/2 and full bloom stages, and (2) birdsfoot trefoil hay during the 1/10, 1/2 and full bloom stages.
An. Husb. 90, Fm. Cps. 256, (NE-24)

- N. Mex. The Effect of Various Food Supplements Upon Roughage Digestion in Ruminants. To determine by digestion trials the digestibility of a native range hay as influenced by the addition of various food supplements.
An. Husb. 3
- N.Y.C. The Development and Use of Indirect Methods for the Measurement of Digestibility and Rate of Consumption of Feedstuffs, Particularly Pasture Forages, by Ruminants. To (1) test adequacy of indicator methods (chromogen and Cr_2O_3) previously developed with steers for measurement of digestibility and intake of grazing cows, and/or modify these to effect reliable measures with cows; (2) compare effectiveness of feeding Cr_2O_3 in concentrate feeds with administering it in capsules; (3) study reliability of intake estimates as influenced by 1 and 2 dosages per day; and (4) attempt to work out a rapid method for determination of chromic oxide.
An. Husb. 58, (NE-24)
- N.Y.C. The Relationship of Time of Cutting to the Digestibility of Different Forages. Learn (1) digestibility of energy and dry matter of first cuttings of orchard grass, brome grass, timothy, alfalfa, Empire birdsfoot trefoil, red clover, Viking birdsfoot trefoil, and ladino clover cut May 20, June 7, July 25 & 7, (2) digestibility of aftermath growth when cut at various intervals, (3) influence of irrigation on digestibility of forage, (4) effect of N fertilizer on digestibility of grasses, (5) relationship of leaf and moisture content to digestibility.
An. Husb., Agron. 90, (NE-24)
- Ohio Improvement of the Method for Determining the Crude Fiber and Nitrogen-Free Extract (NFE) of Feeds. To improve crude fiber method of analysis so that the crude fiber determination will be a measure of the fraction of the feed that is the undigestible carbohydrate fraction and the NFE (by difference) is the readily digestible fraction.
An. Sci. 5
- Okla. Improving the Utilization of Low Quality Roughages. To determine (1) value of alfalfa ash in utilization of low-quality roughages; (2) mineral deficiencies of roughages, which are improved by addition of alfalfa ash; (3) effective combinations of inorganic elements for more efficient use of low-quality roughages; and (4) practical supplements to supply nutrient deficiencies of low quality roughages.
An. Husb., Chem. 874-

- Ore. The Development and Application to Feeding Practices of Techniques for Measuring Range Feed Consumption and Quality by Beef Cattle. (1) To develop indicator techniques suitable for the determination of digestibility of mountain flood meadow hays in the wintering ration for beef cattle. (2) To apply such techniques to the estimation of intake and digestibility of range forage by grazing beef cattle. (3) To study how to efficiently and economically supplement sagebrush range for grazing cattle, based on information obtained under (1) and (2).
An. Husb. 264, (W-34)
- Pa. The Nutritive Evaluation of Forages. (1) To determine the digestible dry matter, digestible protein, and digestible energy of forages of particular value in the Northeast, using sheep as experimental subjects. (2) To determine the above constituents on forages produced by the New Hampshire station for cooperative studies. Metabolizable energy will also be determined on three of these forages. (3) To compare nutrient values of forages as measured by sheep with those measured by other techniques (cattle, rabbits, chemical analysis, etc.).
An. Nutr., Agron. 1263, (NE-24)
- R.I. Nutritive Evaluation of Forages. Learn nutritive value of forages fed to dairy heifers as affected by stage of maturity, learn nutrient yield of forages fed per unit of land, study effect of stage of plant maturity on cellulose and lignin content. Learn digestible protein, digestible energy, and digestible dry matter of one variety of alfalfa and one variety of red clover as sole nutrient to 5 dairy heifers. Like determinations will be made at 3 stages of physiological plant growth: i.e. bud, 1/10 bloom, 1/2 bloom. Chemical analysis will be made on all forages fed according to AOAC procedures. All forages fed will be sampled and analyzed for cellulose and lignin.
Agron., Animal and Dairy Husb. 33, (NE-24)
- S. Dak. Nutritive Value of Grasses and Hays of the Northern Great Plains. To obtain data on composition, digestibility, and productive value of pastures and hays.
An. Husb., Agron., Biochem. 120
- S.Dak. Handling, Storage, and Feeding of Grass Silage with Comparisons of Labor Requirements, Costs, Feeding Values, and Losses in Six Different Methods of Storage.--D. Chemical Analysis of Grass Silage with Different Methods of Storage. To (1) analyze newly ensiled samples for carotene, protein, ash, crude fiber, ether extract, nitrogen-free extract and moisture, and compare with analysis of samples taken at feeding time from silos; and (2) make moisture determinations on silage as it is weighed out to determine bulk losses at time of feeding.
Biochem. 237-D, (NC-23)

Utah

Nutritional Deficiencies in Range Forage and the Supplementary Feeding of Range Livestock. To (1) determine the botanical species and chemical composition of the diet of range livestock with special reference to deficient or excessive nutrients and toxic materials, (2) note effect on calf and lamb crop and other production factors after supplementing deficient diets or instituting preventive or corrective measures for diets with excessive or toxic materials which are consumed by range livestock, (3) develop techniques of handling range livestock for detailed experimental research, (4) study methods of determining digestibility and metabolizable energy content of various species and mixtures consumed by cattle on ranges. Sheep may be used for comparisons.

An. Husb., Forestry and Range Mgt. 421 (W-34)

Va.

Intensive Production of Spring Lambs From Pastures. To (1) compare ladino-clover or ladino-grass mixtures with natural bluegrass white clover pastures under conditions of optimum fertility for intensive spring lamb production, (2) study methods of pasture management necessary for maximum production of early spring lambs from pasture, (3) study methods of parasite control necessary to maintain ewes and lambs on pasture under maximum stocking rates, (4) learn methods of control of infectious diseases, such as foot rot, under intensive grazing with sheep, (5) compare continuous with rotational grazing on permanent bluegrass whiteclover pastures with ewes and lambs under intensive stocking rates.

An. Husb., Agron., Plt. Path. & Physiol. 8340

W.Va.

Measuring the Nutritive Value of Forage Crops. Develop chemical and/or biological techniques for determining nutritive value of forage crops.

Biochem., Agron. and Genetics 70

Wyo.

Nutritional Evaluation of Wyoming Feeds. To determine coefficients of digestibility of the protein in high quality native hay produced in Wyoming.

An. Prod., Chem. 566

Wyo.

Range Livestock Nutrition. Determine digestibility of harvested forages and/or supplements used for wintering range livestock and chemical composition and nutritive value of range forage as related to performance of cattle and sheep. Develop more satisfactory methods of range nutrition research; compile and review data on range forage plants, poisonous plants, and toxic materials in Wyoming forages.

An. Prod. Chem., Agron. 613, (W-34)

B. Concentrates

- T.H. Feeding Experiments with Livestock Designed to More Fully Determine the Possibilities and Proper Use of Locally Available By-Products. To more fully utilize by-products available in Hawaii and make the Territory more self-sufficient in the matter of meats and animal products.
An. Husb., Chem. & Sugar Tech., Soils & Agr. Chem. 265
- T.H. Studies to Determine the Nutritive Value and Metabolism of Products and By-Products of Hawaiian Industry. Seek information relative to value of products and by-products of Hawaiian agriculture and industry for livestock feeding with major emphasis on use of molasses, sugar cane bagasse and pineapple by products by chemical analysis of feeds to be used; learn digestibility; feeding trials to assess production response accompanied by studies of nutrient absorption, nutrient and metabolite levels in blood and urine, metabolism and its relation to requirements for specific nutrients.
An. Husb., Agron. 269
- Ill. Evaluation of the Concept of Biological Value of Protein for Growth and Maintenance. To (1) learn relationship between protein quality and percentage of protein in diet required to produce maximum gain at different levels of intake of protein and energy, and (2) learn relationships between biological value of protein, protein concentration in diet, and energy intake.
An. Sci. 20-306
- Ill. The Nutritive Value of Grains Grown Upon Rich and Poor Soils. To complete analyses of samples now on hand, statistical analyses of data accumulated over past several years and publication of results.
An. Sci. 20-355
- Kans. The Relationship of Physical Balance and Energy Value in Sheep Rations. To measure group and individual lamb response to pelleted and unpelleted rations of varying concentration.
An. Husb., Chem. 236
- Mich. The Use of Nitrogenous Materials in Ruminant Nutrition. To (1) determine optimum protein levels needed to obtain maximum use of roughages; (2) determine extent to which urea or other simple N sources can be used in place of natural protein; and (3) establish role of other nutrients such as trace minerals and organic growth promoting factors required to produce maximum digestion of cellulose and other rather indigestible components of feeds.
An. Husb., Chem. 118

- Mont. Nutritional Requirements of Ewes Wintered Under Range Conditions. 1. Protein Requirements.—To (1) determine effect on ewe weights, lamb production, and wool production of supplemental winter feeding of concentrates with various levels of protein, (2) develop reliable range sample techniques to permit determination of chemical composition of forage consumed by sheep, (3) perfect methods to determine reliably total amount of forage consumed by grazing sheep, (4) study blood protein level and its relationship to state of protein nutrition, and (5) compare milk production of ewes on different levels of protein.
An. Ind. & Rng. Mgt., Wool Lab., Chem., Vet. Res. Lab. 96, MS 846
- N.Y.C. The Protein Requirements of Growing, Fattening Lambs.
To determine minimum protein requirements for optimum growth and fattening of lambs at different initial weights and ages and for lambs at various stages of maturity.
An. Husb. 54
- Okla. Protein and Non-Protein Nitrogen Utilization by Ruminants.
To determine (1) effect of different levels of carbohydrate in ration on use of protein and other feed nutrients by ruminants; (2) under practical feed-lot conditions, relative value of urea and how it may be used to best advantage in supplementing protein of rations for growing and fattening lambs; (3) value of adding small amounts of methionine to rations containing urea and rations containing natural feed proteins; (4) to compare value of ammoniated cane molasses as partial replacement for cottonseed meal for wintering stocker cattle on native grass; (5) compare two methods of feeding ammoniated cane molasses to beef cattle on dry grass—hand fed in bunks, vs. sprayed on dead grass; (6) determine by use of digestion trial data optimum level of furafeed for steer calves, and comparative value of furafeed and cottonseed meal when supplying equal amounts of N in rations for steer calves; and (7) determine if high levels of furafeed are toxic to sheep.
An. Husb., Chem. 709-c
- P. R. The Utilization of Concentrates in the Feeding of Livestock in Puerto Rico. To determine most economical quantities and qualities of concentrate feeds or grain mixtures that may be used satisfactorily for milk, meat, and egg production.
An. Husb. and Vet. 51

Texas

An Evaluation of Animal and Vegetable Protein Feeds With Respect to Chemical Composition and Feeding Value.
To (1) determine cystine content of farm feeds and human foods, (2) develop method for stabilization of tyrosine during hydrolysis of food materials for amino acid assay, (3) determine tyrosine content of farm feeds and human foods, (4) improve microbiological methods for determination of amino acids and to adapt these methods to rapid analysis of the large number of samples necessary in feed control work.

Biochem. & Nutr., An. Husb. 521

W. Va.

Methods to Increase Non-Protein Nitrogen Utilization by Ruminants. To evaluate a variety of non-protein nitrogenous compounds which may be useful as replacements for protein concentrates in ruminant rations containing a high proportion of roughage.

An. Husb., Biochem. 69

C. Feed Adjuvants

Calif.

The Effects of Hormones on the Growth and Fattening of Meat Animals. To learn (1) types of hormones best suited for increasing growth or carcass quality, (2) most effective dose, (3) influence of age, sex, and dietary conditions on effect of treatment, (4) mechanism by which hormones influence metabolic activities.

An. Husb. 1662

Colo.

The Effect of Hormones, Drugs, and Similar Substances on Nutrition of Livestock. To (1) determine the effect of these substances when fed as part of the ration and when administered parenterally on feedlot responses and carcass grade and yield, (2) determine by individual digestion trials the influence of these substances on the digestibility of feeds and the efficiency of nutrient utilization, (3) determine by chemical and/or biological methods the natural and added concentrations feed stuffs of the substances enumerated above, (4) determine by chemical and biological methods the residues of these substances, if any, deposited in organs and tissues, and (5) determine by gross and microscopic examination of organs and tissues any effect ascribable to treatment with these substances.

An. and Dairy Ind. 182

- N. Dak. A Comparison Between Synovex, Orally and Subcutaneously Administered Stilbestrol, and Terramycin for Fattening Lambs. To study (1) effect of stilbestrol and Synovex on gain and feed utilization, (2) effect of treatments on carcass quality and yield, (3) synergistic effect of terramycin with growth stimulants, (4) difference between hormone-like growth stimulants on feed lot lamb losses.
An. Ind. 40
- Tenn. Studies of Endocrine Relationships in Farm Animals.
B. Sheep. To study effects of stilbestrol on growth rate and carcass characteristics in lambs.
An. Husb. 42-B
- Wash. The Effects of Animal Fat, Antibiotics, and Stilbestrol Administered to Fattening Steers Consuming Good and Poor Quality Roughage. To (1) determine the influence of high levels of animal fats in ruminants ration on a. digestibility and efficiency of utilization of the fat and associated dietary constituents, b. vitamin A stores in the liver, c. characteristics of the deposited fat, d. the retention of yellow pigments in the depot fat, and e. total blood lipids; (2) determine the influence of dietary stilbestrol and/or aureomycin on feed efficiency, digestibility of high and low fat and good and poor quality roughage diets; (3) determine the influence of high levels of dietary fat on utilization of pasture; (4) determine the influence of site of introduction of fat and aureomycin deposition on digestibility of feed nutrients; and (5) determine the effects of animal fat, aureomycin and stilbestrol on carcass characteristics.
An. Husb. 1217
- D. Minerals
- Calif. Studies of Mineral Metabolism in Animals. I. Calcium-Phosphate Relations. II. Iodine Metabolism in Cattle and Sheep. III. Mineral Deficiencies on Range Lands.—Calcium, Manganese, Cobalt, Sulfur, and Other Minerals. (1) To study the effect of a low phosphorus diet on reproduction, (2) to continue search for a goitrogenic substance in the water from Hat Creek; and (3) to study nutritional conditions in various parts of the State where livestock production cannot be maintained at a maximum level on native vegetation alone.
An. Husb. 938
- Calif. The Relation of Dietary Mineral Levels Upon Calcium and Phosphorus Metabolism and the Incidence of Parturient Paresis (Milk Fever) in Dairy Cattle. Learn influence of prepartal dietary mineral intake on Ca and P metabolism of cow and upon incidence of milk fever. Find palatable ration supplying sufficient nutrients for gestation and that will prevent milk fever, and find management procedures applicable in control.
An. Husb., Dairy Ind. 1663, Coop. Ext. Service

- Fla. Investigation of Mineral Nutrition Problems of Livestock Through the Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral interrelationships that occur in farm livestock, using suitable laboratory animals.
An. Husb. & Nutr. 346
- Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
An. Husb. and Nutr. 566
- Mo. The Mineral Nutrition of Ruminants. To (1) reevaluate qualitative and quantitative mineral requirements of ruminants, (2) learn mineral element(s) or combination of elements in alfalfa ash which is (are) effective in stimulating appetite and improving performance of cattle and sheep fed low quality roughage, and (3) obtain more data on role of mineral imbalances in etiology of "stiff lamb" disease, urinary calculi, and tetany.
An. Husb. 248
- Mont. Mineral Nutrition of Cattle and Sheep. To (1) compare winter performance and following summer performance on pasture of beef calves wintered on low-phosphorus grass hay with hay ad libitum and varying amounts of phosphorus and trace minerals added; (2) study effect of phosphorus nutrition on blood carotene and vitamin A levels.
An. Ind. & Range Mgt., Chem. 102, MS 871
- Oregon The Role of Minor Elements in Animal Nutrition. To determine the distribution of "trace" or "minor" elements of importance in animal nutrition and livestock disorders. To apply this information to problems in the fields of nutrition and livestock production.
Chem., An. Husb., Dairy Husb. 154
- S. Dak. Selenium Poisoning. To (1) obtain basic information on biochemistry and physiology of selenium toxicity in animals; (2) determine with laboratory animals methods to counteract toxicity of selenium; (3) adapt information now available and that obtained through objective 2 on factors which alleviate selenium toxicity in small animals for use in farm animals; (4) explain metabolism of selenium by plants, to establish chemical forms of selenium in plants and determine toxicity of compounds isolated; and (5) adapt basic information obtained from plant, geologic and soil studies in past to practice of mapping seleniferous land in detail.
An. Husb., Biochem. 19, Coop. SCS

Tenn. Mineral Metabolism in Animals: I. Absorption, Distribution and Physiological Behavior of Calcium and Phosphorus in Farm Animals. To (1) determine the normal distribution of these mineral isotopes administered by the various routes to cattle, swine, and sheep, and to study thereby in detail the normal absorption, utilization and skeletal metabolism of selected minerals in these animals; (2) measure endogenous losses of calcium and phosphorus and from these values determine maintenance requirements in the various species as a function of age; (3) determine the biological availability of calcium and phosphorus from the common dietary sources of ruminants, and simple stomached animals, and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc., upon the availability; and (4) apply radioisotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.

An. Husb. 52, Coop. AEC

Tenn. Mineral Metabolism in Animals: II. Interrelationships of Calcium and Phosphorus with Vitamins, Minerals, Hormones, and Other Factors. To (1) investigate and separate effect of metabolism of calcium and P, certain important factors which are known to influence their behavior in the animal body, and (2) study such elements and substances as are known to induce abnormal bone metabolism that are important for clarification of normal mechanisms and to aid in explanation of toxicological properties.

An. Husb. 53, Coop. AEC

Wis. Mineral Metabolism and Mineral Requirements of Animals. To study (1) the effect of mineral supplements of various kinds on animals fed low lime rations, (2) the role of inorganic compounds containing such elements as iron, copper, nickel, cobalt, zinc, and manganese, and (3) factors responsible for nutritional anemia and effect of various inorganic elements and compounds in correcting such anemias. Fundamental investigations on the phenomena of hemoglobin building on the body will be continued.

Biochem., An. Husb. 8

Wyo. The Selenium Problem as Related to Poisoning in Animals. To (1) study effect of selenium poisoning on the metabolism of the phosphorylated compound in vivo by the use of radioactive phosphorus; (2) study effect of selenium poisoning on sulfur; (3) study metabolism of selenium in animals fed with plants containing selenium in organic and inorganic form; (4) develop tolerance in selenium poisoning; and (5) convert elemental selenium to soluble selenium by ruminants.

Chem. 491

Wyo.

Selenium in Vegetation, Water, and Animal Tissues.

To (1) have a geological map of principal seleniferous areas of the State; (2) correlate quality of stock water with geological outcrops; (3) establish method of isolation of organic forms of selenium from representative species of *Astragalus* and *Stanleya*; (4) attempt to explain plant response to different forms of soil selenium; and (5) determine what constitutes a selenium value of clinical significance in live-stock injury from ingestion of seleniferous vegetation.

Chem. 493

E. Vitamins

Ala.

The Tocopherol Content of Feeds and Forages and the Significance of Vitamin E in the Nutrition of Farm Animals.

To (1) determine concentrations of total tocopherol, alpha tocopherol, and unsaturated fatty acids in representative feeds, feeding stuffs, and forages, as influenced by stage of maturity, environmental conditions and processing or treatment and storage; (2) survey blood serum levels of tocopherol, unsaturated fatty acids and vitamin A in cattle and sheep under various feeding practices in various diseases; (3) determine influence of diet and dietary factors on development and cure of nutritional muscular dystrophy in rabbits and of "white muscle disease" in cattle; (4) ascertain cause and nature of lightened, slate-grey color of muscle in "white muscle disease" and analogous condition in rats and rabbits; and (5) determine if vitamin E is important in swine nutrition.

An. Husb. 323

Ark.

Nutritive Principles in Green Feed. To demonstrate, isolate, and identify the unknown or little understood nutritive principles of green feed, and to determine the part each plays in the growth, health, and reproduction of the various species of laboratory and farm mammals.

An. Ind. and Vet. Sci. 167

Colo.

The Utilization of Carotene in the Animal Body. The procedure involves preliminary studies on rabbits and chickens to determine their ability to store vitamin A and carotene, a study of body stores as related to ration constituents determination of the cause of variation in the mobilization and utilization of vitamin A and carotene in the animal body, isolation and identification of specific substances found to be a factor in the carotene-vitamin A picture, and a study of the effect of physiological processes taking place in the digestive tract of ruminants, swine, and poultry on carotene, vitamin A, and such extrinsic factors as have been found to exist.

Chem. 87

Minn.

The Relation of Nutrients to Metabolic Processes. A wide variety of techniques and procedures will be used in this project to study with laboratory animals and with tissues derived from them and from larger animals the chemical reactions involved in metabolic processes and the enzymes associated with them. Of the many ramifications of the problem, attention will initially be focused on (a) the metabolic function of vitamin E, studying (1) the possible importance in enzymic oxidation-reduction processes of a primary oxidation product of vitamin E which has already been recently discovered and isolated in this laboratory, and (2) the relation of vitamin E to oxidative phosphorylation processes in the organism; (b) the role of potassium in metabolic phosphorylations associated with the utilization of glucose; (c) the possibility that thyroxine may form a reversible oxidation product; and (d) the nitrogen metabolism in the early postnatal period.

Biochem. 205-2215

N.Y.C.

The Nutritional Requirements of Herbivora as Studied by Purified Diet Methods. To determine the nature of the deficiency in purified diets and devise a diet of purified ingredients that will sustain satisfactory growth, reproduction, and lactation in herbivorous animals.

An. Husb. 70, BJ5-17

Ohio

The Effect of Adsorbents and Minerals on the Determination of Riboflavin and Other B-Complex Vitamins and on Their Availability to Animals. To (1) determine effect of adsorbents and minerals on present accepted methods of assaying for riboflavin and other B-complex vitamins; and (2) study effect of adsorbents and other B-complex vitamins to animals.

An. Sci. 3

Oregon

Determination of Nature and Control of White Muscle Disease. To (1) determine further the nature and relationship of so-called white muscle disease of calves and lambs; (2) determine cause(s) of the disease; (3) develop more rapid and effective methods of diagnosis, particularly in live animals; and (4) develop program for preventing or controlling the disease(s).

Chem., An. Husb., Vet. Med. 175

S.Dak.

Effect of Vitamin Supplementation on Lambs. To learn (1 & 2) effect of vitamin D supplementation on growth rate, feed efficiency and carcass quality; optimum dose level for treatment of feeder lambs. To study (3 & 4) effects of supplementing ration with Ca and P; relationship between vitamins A and D in lamb rations.

An. Husb. 282

Wis.

The Effect of Vitamins and Other Organic Nutrients on the Growth, Milk Production, and Reproduction of Animals. To determine factors concerned with the adequate nutrition of farm animals as related to Wisconsin conditions.

Biochem., An. Husb. 10

F. Management Practices

- Ark. Investigation of Management Practices for Sheep and Lamb Production. To study sheep production problems related to Arkansas conditions as (1) develop and test new management practices conducive to increased production of lambs or wool, (2) re-evaluate management practices which are influenced by improvement or developments in feeding or breeding of sheep.
An. Ind. and Vet. Sci. 401
- Calif. Range and Livestock Management in the Granite Area of the Sierra Foothills, San Joaquin Valley. Investigations of non-specific abortions and stillbirths in range cattle, effect of high-protein diet on first calving of 3-year-old heifers, congenital deformities in range cattle; self-feeding range cattle with salt-concentrate mixtures as compared to daily hand feeding, range forage deficiencies and toxic substances, using agricultural gypsum instead of salt in self-feeding of concentrates; range fertilization; and range rodent damage.
An. Husb. 1005, Coop. Forest Service
- N. Dak. The Effect of Practical Farm Rations on the Lactating Ewe and Growth of Her Lamb. To determine which practical farm rations are most economical for sheep raised under farm flock conditions.
An. Ind. 132e
- N. Dak. Early Versus Late Lambing as it Affects the Economy of Sheep Production. To find which system of flock management is the most economical and provides the greatest returns for labor and capital investment.
An. Ind. 168

Carcass Studies

- Iowa The Influence of Dietary Supplementation Selection and Breeding on Carcass Quality and Tissue Composition of Meat Animals. To determine (1) effects of protein, fat, antibiotics, trace minerals, calcium and phosphorus of swine rations on carcass quality and tissue composition; (2) effect of roughage, protein and protein substitutes, and hormones on quality of lamb and beef carcasses; and (3) make additional studies, largely biochemical, to support objectives above.
An. Husb. 1239
- Kans. The Effects of Implanting Stilbestrol in Feeder Lambs and Feeding a Stilbestrol Pre-Mix to Feeder Lambs Upon the Quality and Palatability of the Carcass. Obtain information regarding body changes when stilbestrol is implanted in or fed to feeder lambs.
An. Husb. 423

Va. Processing and Merchandising Meats from Animals Produced Under Virginia Farm Conditions. Investigate procedure and develop ways of processing and merchandising meats from cattle and sheep produced under Virginia farm conditions: hogs fed, managed, and bred so as to increase ratio of lean to fat in carcass. Devise means of estimating carcass value in live animals; develop procedures for more precise evaluation of carcasses from meat animals in breeding, feeding, and management research. Investigate methods of curing and storing home meat supplies.

An. Husb., Home Econ., Econ.(Agr.) and Rural Sociol. 8455

Wash. Factors Influencing the Desirability and Nutrient Content of Meat and Meat Animals for Human Consumption. To determine effects of (1) genetics, nutrition, and other factors on carcass quality of meat animals and on quality and nutrient content of meat; and (2) storage, processing and preservation on quality, nutrient content, physical structure, and economic value of meat and meat products.

An. Husb. 1161

Wool Technology and Marketing

Colo. Preparation and Processing of Colorado Wools. To (1) develop a method of describing grease wool characteristics that affect the market price for wool, (2) compare financial returns from marketing and processing grease wools which have had some preparation on the ranch as compared to the common practice of marketing the wool with no preparation on the ranch.

An. and Dairy Ind., Econ. and Sociol. 203, (WM-23)

Mont. Measurements for Use in Marketing Wool. To determine the value of objective physical measurements for use in the marketing of wool.

Wool Lab., An. Ind. & Range Mgt., Econ.(Agr.) and Sociol. 4, M.S. 949, (WM-23)

N. M. Preparation, Processing, and Marketing of New Mexico Wool. To (1) test economic methods of grading and selling wool compared to old-line practices; (2) find better-paying market for tags, crutching, off-sorts and wools shrinking about 75%; (3) determine relative value of fine ram and ewe wools; (4) develop reliable method to estimate fleece and clip shrinkage in field; and (5) determine effect of crimp on top making characteristics, a guide to more exact grading of fine wools for processors.

Econ.(Agr.) 28, (WM-23), Coop. ARS

- N. M. The Effect of Color on the Market Value of Wool. To (1) develop objective standards for degrees of yellowness; (2) determine economic importance of yellow color in wool; and (3) classify types and degrees of discoloration and determine the causative factors.
Econ.(Agr.) 33
- Texas Marketing Fine Wool on a Quality and Mill Performance Basis. To determine (1) the more valuable characteristics of Texas fine wools to the manufacturer, and (2) the economic significance of these physical properties in the market.
Econ. & Sociol.(Agr.) 996, (WM-23)
- Utah The Value of Objective Physical Measurements For Use In Marketing Wool. Develop methods of preparing, sampling, and measuring wool as basis for describing wool for marketing. Learn economic limitations of application of objective physical measurements in describing grease wool for marketing.
An. Husb., Econ.(Agr.) & Marketing 468, (WM-23)
- Wyo. Physical Characters and Values of Grease Wool as Affected by Preparation and Processing. To study the influence of physical characters, preparation, and processing on the values of grease wool.
Wool, Econ.(Agr.) ES 276, (WM-23), Coop. ARS

REGIONAL PROJECTS

NC--25

Factors Affecting the Utilization of Feed by Ruminants.

To improve the utilization of roughages by ruminants with emphasis upon the utilization of the carbohydrate fraction.

Cooperating stations: Federal-grant projects - Illinois, Kansas, Michigan, Minnesota, Missouri, Nebraska, and Ohio.

NC-27

Causes and Control of Bloat in Ruminants. (1) To determine

the physical and chemical characteristics of alfalfa and ladino clover and fattening rations associated with bloat. (2) To determine the physical and chemical characteristics of rumen ingesta from normal and bloated animals. (3) To study the physiological responses of ruminants to bloat-producing feeds, chemicals, and procedures. (4) To develop and elucidate measures for the control of bloat.

Cooperating stations: Federal-grant projects - Iowa, Michigan, Minnesota, and Ohio. Non-Federal project - South Dakota.

NE-24

The Nutritive Evaluation of Forages. (1) To evaluate

various forages grown under known conditions and harvested at specific stages of maturity by determining digestible protein and digestible energy. (2) To develop methods for the nutritive evaluation of forages: These to include the use of small animals and chemical analysis. (3) To conduct animal production trials simultaneously insofar as possible.

Cooperating projects: Federal-grant projects - Delaware, Maryland, Massachusetts, New Hampshire, New Jersey, New York (Cornell), Pennsylvania, and Rhode Island.

S-29

Improving the Production of Early Milk Fat Lambs. Develop-

ment of systems of breeding and management of sheep that will result in earlier lambing, increased productive efficiency, and greater adaptation to the environmental conditions of the southern region. These objectives will be approached through a. Breeding methods to effect permanent genetic changes including selection, inbreeding, crossbreeding, and recurrent selection; b. The use of exogenous hormones to control the reproductive processes; and c. Study of the effects of environmental factors to determine optimum environment for maximum reproductive efficiency.

Cooperating stations: Federal-grant projects - Arkansas, Georgia, Kentucky, Mississippi, South Carolina, and Virginia. Non-Federal projects - North Carolina and Texas.

WM-23

Marketing Wool on a Descriptive Basis. (1) To ascertain the feasibility of marketing grease wool on a descriptive basis using present American Society for Testing Materials methods of tests and standards for objective measurements. (2) To determine a. the economic possibilities and limitations of pre-marketing preparation and/or pooling, b. the type of pre-sale preparation that will meet the requirements of credit agencies, and c. the economic importance of the physical characteristics of grease wools as related to the suitability of these wools for various manufacturing processes. (3) To study the possibility of further developing standardized methods of sampling and testing grease wools.

Cooperating stations: Federal-grant projects - Colorado, Montana, New Mexico, Texas, Utah, and Wyoming.

W-34

Range Livestock Nutrition. To determine the quantitative and qualitative nutritive value of range forage consumed in terms of chemical analysis, botanical classification, soil, site, stage of maturity, season, drouth, and digestibility relating these factors to reproductive performance, growth, and market value of range cattle and sheep.

Cooperating stations: Federal-grant projects - Calif., Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming.

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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS
NOVEMBER 1955

SWINE

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

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CURRENT SERIAL RECORDS

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference, certain projects are listed more than once.

The relevant regional projects, if any, appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

Breeding

- Ala. Methods of Developing Improved Strains of Swine for the Southeast by Breeding. To study effectiveness of a selection program based on cross-performance in developing improved strains of swine.
An. Husb. and Nutr. 529
- Ark. Improvement of Swine Through System of Breeding.
To (1) develop practical system of swine breeding which should result in greatest possible production of high quality pork; (2) maintain and improve existing UArk line of Poland Chinas so it can continue to be used for basis of breeding program and further dissemination to purebred and commercial breeders, and other inbred lines and breeds not previously tested with UArk lines; and (3) continue to emphasize carcass quality, rate of gain, and efficiency of gain in selection program.
An. Ind. and Vet. Sci. 174
- Calif. Qualitative and Quantitative Inheritance in Animals.
To study (1) inheritance of differences in growth and conformation and relate this study to carcass yield and dressing percent, (2) effect of genetic and environmental factors on milk and butterfat yield in dairy cattle, (3) inheritance of wool characteristics, (4) resistance and susceptibility to parasites and disease, (5) effects of inbreeding upon size, vigor, fecundity, production, and performance, (6) gene frequencies related to specific gene affects in various breeds, and (relation between gene and character.
An. Husb. 939
- Ga. The Relative Productive Value of Various Crossbreeding Systems for Use with Livestock. To learn (1) productive value of crosses and rotational breeding systems, (2) how single and double crosses compare, and comparison with a random-bred population, (3) comparison of 2, 3, and 4 lines or populations used in a rotational program, with single and double crosses, and with a random-bred population, (4) how many different populations should be used in a rotational program to get maximum economic performance, (5) how performance of a rotation can be predicted from lines performance or single cross performance. Mice used as test animals.
An. Husb. 91
- Ill. Effects of Intensity of Selection Under Different Mating Systems. To determine how different intensities of selection affect degree of heterozygosity within populations inbred at different rates.
An. Sci. 20-380

- Ind. The Improvement of Swine Through the Application of Breeding Methods. To (1) establish by moderate inbreeding, relatively homozygous lines of Berkshire, Yorkshire, Chester White and Landrace-Duroc-Tamworth swine; (2) continue investigation of methods for maintaining and improving inbred lines of swine; (3) test value of inbred lines of swine in crosses for improvement in performance and carcass merit of swine; and (4) determine if variations in physiological characters can be used to evaluate performance of inbred lines.
An. Husb., Vet. Sci. 62, coop. Reg. Swine Br. Lab., ARS
- Ind. The Identification of Superior Strains of Meat-Type Swine. To (1) identify lines of swine that are outstanding in performance and produce superior meat carcasses; (2) investigate correlations between growth, feed efficiency, and carcass merit of swine, and relate differences in these characteristics with physiological differences between lines; and (3) evaluate various methods of selection for superior meat type.
An. Husb. 740
- Iowa Improvement of Swine Through Breeding. To find breeding methods more effective in improving swine productivity, giving major emphasis to problems of simultaneous inbreeding and selection.
An. Husb., Vet. Med. 1127, coop. Reg. Swine Br. Lab., ARS
- Ky. Hampshire Swine Herd Improvement Project. To develop an improved herd of Hampshire swine by testing and selection methods that can be used by almost any breeder.
An. Ind. 11
- Ia. Improvement of the Carcass Qualities of a Herd of Duroc Swine by the Development of Inbred Lines. To test the method of improving the carcass qualities of a herd of Duroc swine by development of inbred lines - the better lines to be combined at a suitable time.
An. Ind. 812
- Md. The Development of Superior Lines of Swine Based on Cross-bred or Purebred Foundations. To (1) continue development and evaluation of Md. No 1 breed of swine; (2) study further records which have been secured on the breed; (3) study further factors influencing relative degree of emphasis which should be placed on various selection criteria with special consideration to Md. conditions; and (4) develop a new line or lines based on Md. No. 1 breed, other breeds or crossbred combinations.
An. Husb. C-20, coop. ARS

Minn. A Study of Systems of Breeding for the Improvement of Swine. To (1) use two inbred lines already made and the third well along in development as basis for further improvement in the lines and methodology, (2) develop sub-lines of the basic lines and learn how to improve already good genetic material, (3) continue to simplify technique of applying basic genetics to livestock improvement, (4) gather reliable data so they may be analyzed statistically.

An. Husb. 1401, coop. Reg. Swine Br. Lab., ARS

Minn. A Study of the Interaction of Genetics and Environment in Swine. To (1) study interaction of different levels of feeding and rate of gain on economy of production and quality of carcass in different Minnesota No. 1, No. 2, and No. 3 crossbred combinations, (2) introduce sub-lines of the above into this study, (3) study different genetic groups in respective responses to varied hormone treatments, (4) learn more of the interaction of genetics and environment in swine.

An. Husb. 1420

Mo. Methods of Selection and Breeding for Swine Improvement. To develop more effective breeding methods for improving the efficiency of production & the value of the end product-the hog-more specifically to (1) continue testing effectiveness of recurrent selection for improving the performance of strain crosses, using outbred & crossbred matings as controls; (2) develop more accurate & useful measures of fertility, prolificacy, sow productivity, rate & economy of gain & carcass desirability for use in selection; (3) investigate the influence of different management & feeding practices on expression of hereditary differences of performance in swine; (4) explore further the fundamental nature of inbreeding & heterosis effects on reproduction, growth, viability, feed utilization, milk production, and carcass composition in swine; (5) expand the useful strains or cross combinations through cooperating breeders & swine producers for the production of market hogs; (6) encourage swine producers to use breeding principles developed in this project in selecting their own breeding stock & making mating plans for commercial & purebred hog production, and (7) develop new inbred lines of hogs within a breed for possible crossing performance using principle of reciprocal recurrent selection.

An. Husb. 3, coop. Reg. Swine Br. Lab., ARS

Nebr.

Systems of Breeding and Selection of Swine Using the Duroc Breed and Various Line and Breed Crosses. I. Selection for Performance Characters in a Non-Inbred Population. II. Sampling the Duroc Breed for New Stock To Be Used in Improving Present Inbred Lines. III. Reciprocal Selection for Sow Performance and Carcass Desirability. 1. To test effectiveness of selection for economic characters in (a) a noninbred herd of Durocs in which inbred lines are used in rotation, and (b) a rotation crossbred herd. 2. To (a) develop inbred lines based on a number of small groups which will be intensively inbred for a generation or two; (b) test performance of these groups both as straight lines and in line and top crosses with unrelated stocks; and (c) select on basis of performance in (b) the best lines for use in forming a synthetic stock, retaining best features of both old and new inbred lines. 3. Develop stock having high sow performance and high carcass desirability, by selection in two types; purposes are to estimate genetic relationships between traits and to estimate importance of heredity and environmental factors causing variation. Learn how selection of said characteristics for sows effect rate of growth and feed efficiency. Study effect of type change on nutritional requirements on swine (energy requirements to be studied; protein, P, B-vitamins, Ca, and trace minerals may be studied).

An. Husb. 240-I, II, III, coop. Reg. Swine Br. Lab., ARS

Nev.

The Effect of Plane of Nutrition on Selection for Traits of Economic Importance in Swine. To learn (1) if mass selection is effective in developing a strain of meat type swine that will gain rapidly and economically on a high roughage diet, (2) if ability to gain rapidly involves a different genotype than growth ability on a conventional ration, (3) effect of nutritional environment on effectiveness of selection for growth ability of swine.

An. Husb. 12

N. Car.

Testing Inbred Lines of Swine. To determine (1) whether hogs produced from inbred lines of swine in line-crosses or top-crosses will be superior for commercial purposes to those obtained by crossing outbred members of the pure breeds; (2) which lines perform best under North Carolina conditions; and (3) development of new and useful inbred lines of swine.

An. Ind. 62

- Ohio Grade or Pure Breeding, and Rotation Cross Breeding for the Production of Market Hogs. To (1) compare performance and killing qualities of purebred Durocs, Yorkshires, Berkshires, and Beltsville No. 1's with two types of rotation crossbreds, one using Duroc, Yorkshire and either Poland China or Beltsville No. 1 sires in turn on successive generations, others using sires of Beltsville No. 1, of a colored line, in turn on successive generations of dams, (2) outcross and re-inbreed an Ohio Duroc line of promise, and (3) maintain good performing and killing strain of Berkshires through inbreeding.
An. Sci. 42, coop. Reg. Swine Br. Lab., ARS
- Okla. The Development and Testing of Inbred Lines and Selection for Specific Combining Ability in Swine. To learn (1) feasibility of selecting lines for specific combining ability in a reciprocal recurrent selection program; (2) test single crosses of lines with other lines to identify desirable multiple lines cross combinations for commercial use; (3) develop improved methods of selecting breeding stock for traits of economic importance; and (4) sample existing breeds of hogs more extensively for genetic material to be used in developing lines.
An. Husb. 808, coop. Reg. Swine Br. Lab., ARS
- Pa. The Value of Landrace Strains of Swine for Crossbreeding with Domestic Swine. To determine value of crossbreeding domestic breeds with new inbred strains of hogs in more efficient production of high quality market pork carcasses.
An. Husb., Chem. (Ag. & Biol.) 1121, coop. ARS
- S. Car. Relations of Certain Animal and Carcass Characteristics to Yield of Lean Cuts in Swine. Learn rate and efficiency of gains of selected pigs from production registry litters produced by State swine breeders. Ascertain relation of animal and carcass characteristics to yield of lean cuts in swine. Assist breeders in producing certified meat type litters from production registry litters.
An. Husb. 54
- S. D. Inbreeding, Linecrossing, and Selection Within the Hampshire, Duroc, and Yorkshire Breeds. Investigate methods of breeding and selection for improvement of swine in litter size, vitality, growth rate, economy and gain, and carcass desirability. Demonstrate application of methods learned by research.
An. Husb. 124, coop. Reg. Swine Br. Lab., ARS

Texas

Swine Breeding Improvement Based on Performance.

To (1) develop and standardize procedures and techniques for testing production performance of economically important characteristics in breeding and market hogs; (2) identify and develop superior lines of breeding stock as to prolificacy, weaning weight of litter, rate and economy of gain, net carcass merit, and longevity of breeding stock; and (3) determine estimates of heritability for and genetic correlations between traits in second objective.

An. Husb., Home Econ. 956

Wash.

Development of a Bacon-Type Hog Adapted to the Feed and Climatic Conditions of the State of Washington. To develop strains of swine which are adapted to the feed and climatic conditions of Washington and which will produce carcasses containing the maximum amount of lean meat and the minimum amount of fat consistent with firmness of flesh.

An. Husb. 671

Reproduction and Lactation

Ill.

Physiology of Reproduction in Swine. To study reproductive phenomena in swine, with particular reference to parturition, in order to find a method of controlling this process with respect to time of its occurrence.

An. Sci. 20-352

Iowa

Viability and Growth of Pigs as Affected by the Nutrition of the Sow During Gestation and Lactation. To determine (1) causes of pig losses attributed to the nutrition of the pigs both in utero and after birth; (2) effects of feeding different rations during gestation upon lactation, and on the growth and development of pigs from birth to market weight; and (3) nutritive requirements of pigs.

An. Husb. 959

Ky. Effect of Plane of Nutrition on Semen Characteristics and Breeding Ability of Boars. To compare following characteristics associated with breeding ability of boars on a high plane of nutrition with those of boars on a low plane of nutrition: 1. sexual desire, 2. quantity and quality of semen, 3. conception rate, and 4. early embryonic death rate.

An. Ind. 63

Md. A Study of the Effects of Source of Protein and Level of Protein on Reproductive Performance and Carcass Quality of Gilts. To (1) learn effects of quantity and quality of protein upon reproductive performance of gilts under Maryland conditions, especially a. attainment of puberty, b. number of ova released at first and second estrus, and c. embryo survival, (2) develop sound protein level to be recommended for breeding swine, (3) learn if protein levels and/or quality have any effect on carcass quality.

An. Husb. C-23

Minn. A Study of the Physiology of Reproduction with Special Emphasis on Degrees of Fertility. To (1) study normal prenatal development in the pig that is already well advanced, (2) study females that give evidence of being in process of resorbing their fetuses with the objective of finding underlying causes, and (3) determine causes of failure of both males and females to mate and produce offspring.

An. Husb. 1409

- Minn. Diet as a Factor in Swine Reproduction. To (1) develop satisfactory method of restricting energy intake when animals are self-fed; (2) determine minimum level of energy which will produce satisfactory reproduction and lactation; and (3) determine minimum level of protein adequate for satisfactory reproduction and lactation.
An. Husb. 1415
- Minn. The Effect of Maternal Nutrition on Development, Growth, and Performance of the Young. Small laboratory animals will be used for initial studies. Dietary restrictions of mothers in caloric, protein, mineral, and vitamin intake, as well as production of acute temporary vitamin deficiencies by means of vitamin analogues, will be used as experimental techniques.
Biochem. 1514
- Mo. Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To (1) make a thorough study of the chemistry and/or biochemistry of male and female germ cells in order to gain knowledge which is needed as a basis for future investigations involving a. ova and spermatozoa storage and preservation, b. artificial insemination, c. ova transfer, d. fertilization mechanism, and e. chemistry and physiology of gene action; (2) investigate the enzyme systems and metabolic activities of male and female gametes, the results of these studies being basic requirements for further work on storage media, cold shock phenomenon of spermatozoa, low temperature storage of ova and spermatozoa, and possibly to other reproductive processes or activities affecting fertility and litter size; (3) characterize and isolate certain factors present in egg yolk, boiled milk, chick embryos and other biological tissues which aid in preservation of the viability of spermatozoa of farm animals and protect them against a number of adverse environmental conditions including sudden lowering of temperature; and (4) make further investigations into the physical requirements of male and female germ cells.
An. Husb. 81
- Mo. Estrus, Ovulation, Nidation, Embryonic Deaths, and Related Phenomena in the Female Spermatogenesis and Related Physiological Functions in the Male. To study the fundamental anatomy and physiology of the reproductive organs of farm animals with special emphasis, at present, on the litter bearing animal, swine.
An. Husb. 222

- Mo. The Role of Hormones in the Biochemical and Physiological Activities of the Reproductive Organs. To (1) learn role of various endocrine secretions in reproductive cycle, and inter-relationships existing between the many endocrine secretions, (2) study changes, enzymatic and otherwise, induced in uterine tissues by steroid hormones, (3) develop diagnostic tests to determine reproductive efficiency of a female, and the discovery of therapeutic methods and production practices conducive to maximum productivity in the female, (4) study mechanism of hormone action at cellular level and interrelationship of vitamins, hormones and enzymes in normal and pathological reproductive physiology.
An. Husb. 223

- Mo. Endocrine Secretions as Related to Growth, Reproduction, and Gene Action. To learn (1) influence of sex on performance, body development, and carcass quality of market hogs, (2) influence of various hormone treatments on performance, body development and carcass quality in growing-fattening pigs and on milk production in sows, (3) influence of hormones on phenotypic expression of gene action.
An. Husb. 276

- Okla. Sterility, Reproduction, and Lactation Disorders in Swine. To (1) study a wide range of nutritional problems in raising, with the aid of the sow, a higher percentage of the pigs farrowed, and raising them to heavier weights at 12 weeks of age; (2) determine effect of treatment to 12 weeks on subsequent performance of pigs fed to market weight on a standard ration; (3) study effect of feeding antibiotics continually over a period of several generations as compared to feeding the antibiotic only to young pigs; (4) use the rat for "pilot" research on effects of dietary factors upon growth, reproduction, and lactation--and, more specifically, to (1) study effect of the physical state of the ration on amount of feed consumed by young pigs; (2) evaluate addition of antibiotics in rations for young pigs, and study the kind, level, and method of administration; (3) study effect of adding materials, as molasses and flavoring agents, on feed consumption of young pigs; (4) study effect of level and quality of protein in rations for pigs during nursing and immediate post-weaning period; (5) continue investigation on factors in successful reproduction and lactation in the rat, primarily the effect of vitamin B₁₂; and (6) continue investigation on dietary factors in reversal of growth depression induced by thyrotoxicosis in young weanling rats.
An. Husb., Chem. 603

- Ore. The Measurement and Improvement of Fertility in Farm Animals.—1. The Evaluation of Semen Production and Libido in the Male Farm Animals. 2. The Role of Hormones and Nutrition on Gamete Production, Prenatal Survival, Mating Response, and the Estrual Cycle. 3. The Effect of Breed, Season, Age, and Management Upon Fertility. To determine (1) effect of chemical, physical, and bacteriological factors upon semen quality and fertility, and (2) effect of age and frequency of service on semen production and quality; (3) effect of the hormones, Progesterone, F. S. H., L. H., and Testosterone, on gamete production, fertilization rate, prenatal survival, and mating response; (4) concurrence of estrus and ovulation in the post-partum female and its relation to subsequent fertility; (5) factors influencing age at puberty and relationship of age at puberty to subsequent fertility, and (6) effect of breed differences on breeding behavior and fertility in farm animals and the relationship of season to breed response.
An. Husb. 155-1, 2, 3
- Texas A Study of the Maturation Process in the Ova of Mammals.
To (1) determine normal maturation process of egg nucleus in cow, ewe, sow, mare, and mule, (2) ascertain maturation response of egg nucleus during induced ovulation in both the follicular and luteal phase of the cycle; and (3) obtain data for cause of infertility of mammalian eggs.
An. Husb. 854
- Texas Factors Affecting Reproductive Efficiency in Swine.
To (1) learn effects of various feeding and management factors upon reproductive performance in swine under Texas conditions as they affect a. attainment of puberty, b. number of ova released during first few heat periods, c. cytological characteristics of ova released in first few heat periods, d. embryo survival, and (2) ascertain extent to which size of litter farrowed is influenced by a. seasonal effects, b. breed differences, c. hormone therapy.
An. Husb. 870
- Wis. Causes of Low Fertility in Swine. To (1) determine phases of reproductive process where failure is most likely; (2) develop methods of diagnosis of causes; (3) identify reproductive failures with their most likely cause; and (4) recommend, on basis of findings, researches on breeding, nutrition, and swine management to correct existing low fertility.
Genetics, An. Husb. 724

Nutrition and Management

A. General

- Ark. Nutritive Principles in Green Feed. To demonstrate, isolate, and identify the unknown or little understood nutritive principles of green feed; and to determine the part each plays in the growth, health, and reproduction of the various species of laboratory and farm mammals.
An. Ind. & Vet. Sci. 167
- Ark. Nutrition of Swine. To determine nutritional needs of swine in various growth stages, effect of nutrition of sow on nutritional value of milk for young pigs, inter-relationships of various nutrients, symptoms and etiology of nutritional failures, best and most economical methods to prevent and reduce failures, and effect of various food nutrients in nutritional value of meat for human use.
An. Ind. and Vet. Sci. 306
- Fla. Nutritional Requirements of Pigs Weaned at an Early Age.
Obtain basic information on nutritive requirements of baby pigs.
An. Husb. and Nutr. 738
- Haw. Feeding Experiments with Livestock Designed to More Fully Determine the Possibilities and Proper Use of Locally Available By-Products. To more fully utilize by-products available in Hawaii and make the Territory more self-sufficient in the matter of meats and animal products.
An. Husb., Soils and Agr. Chem. 265
- Idaho Specific Nutrient Deficiencies of Feeds Available to the Growing Pig. To (1) determine nutrient deficiencies of rations composed of feeds available to swine producers of Idaho for young pigs from weaning to 80 pounds, (2) identify nutritional deficiency symptoms of pigs fed rations deficient in specific nutrients, and (3) develop rations from available feeds that will support optimum growth and health of the young pig.
An. Husb., Vet. Sci. 170

- Ill. Evaluation of the Concept of Biological Value of Protein for Growth and Maintenance. To (1) learn relationship between protein quality and percentage of protein in diet required to produce maximum gain at different levels of intake of protein and of energy, and (2) learn relationships between biological value of protein, protein concentration in diet, and energy intake.
An. Sci. 20-306
- Ind. The Amino Acid Requirements of Growing Swine. To determine minimum amount of each indispensable amino acid needed by growing swine when other amino acids are fed at levels to give optimum growth.
An. Husb., Biochem. 334
- Ind. The Role of Fat in the Nutrition of Swine. To determine (1) optimum level of fat for swine for metabolic needs, growth rate, feed efficiency, and carcass quality; (2) type of fat best used by growing and fattening swine, (3) specifically minimum fat needs of swine; and (4) "essential fatty acid" needs of swine as to kinds and amounts.
An. Husb. 715
- Mass. Feeding-Management Practices in the Utilization of Cooked Garbage for Pork Production. Learn season variation in chemical composition of three types of cooked garbage: municipal, restaurant, and institutional; and most economical ways of supplementing (with protein, minerals, etc.) to develop a balanced ration for growing-fattening pigs, brood sows, and gilts. Learn benefits of disease control and management programs. Study carcass of pigs grown by program.
An. Husb. 1040
- Minn. The Nutrition and Management of Pigs from Birth to Weaning. To (1) develop satisfactory substitute for sow's milk, nutritionally and economically; (2) develop satisfactory, economical dry ration for baby pigs so as to wean early from the sow or from "artificial" milk; and (3) determine most satisfactory management procedures to use when pigs are weaned at an early age.
An. Husb., Biochem. 1412

Minn. Dietary Requirements of Pigs in Dry Lot. To determine the relative feeding value of thin kernels as compared with plump kernels of the same lot of Kindred barley.

An. Husb. 1416

Mo. Nutritive Requirements of Swine. a. Vitamins and Unrecognized Nutrients in Swine Nutrition. b. Proteins and Amino Acids in Swine Nutrition. c. The Nutritive Requirements and Manner of Feeding Suckling Pigs. d. The Influence of Plane of Nutrition on Carcass Desirability in Swine.

a. To discover nutritional factors responsible for suboptimum production of swine. b. To study the level of protein required by weanling pigs in dry lot and to study effect of adding amino acids to rations of natural feedstuffs that are thought to be low in these amino acids. c. To formulate rations that will promote fast, economical gains in suckling pigs and employ methods of feeding to obtain optimum consumption of the rations. d. To determine effect of good quality pasture combined with a limited grain ration on production costs and carcass quality of market hogs.

An. Husb. 141-a, b, c, d

Nebr. The Nutrition and Management of Pigs of Suckling Age. To (1) determine requirements of suckling pigs for specific nutrients, including minerals, proteins and/or amino acids, and water soluble vitamins; (2) determine influence of various dietary factors, (antibiotics, surfactants and trace minerals) on performance of pigs of suckling age; (3) develop a "sow's milk replacer" which can be compounded economically and prepared with liquid skim milk; (4) develop management procedures adequate for managing young pigs reared on "synthetic" milk; and (5) improve creep feeding and management for suckling pigs, with the objective of increasing feed consumption and weaning weights.

An. Husb., Biochem. and Nutr. 426

Nebr. Nutrient Requirements of Sows Maintained Continuously in Drylot During the Gestation and Lactation Periods. To determine effect of these sources of unidentified factors upon gestation-lactation performance of first litter gilts; dried whey, dehydrated alfalfa meal, grass juice concentrate, and condensed fish solubles.

An. Husb., Dairy Husb. 455-A

N. Car. Nutritional Requirements of the Suckling Pig. To determine (1) the trace element requirements of the suckling pig and (2) the hitherto unrecognized growth factors necessary for the growing pig, from one day of age to 8 weeks of age. To improve the nutritional status of the suckling pig both by (a) attempting to increase the quantity and quality of the dam's milk by supplementing her diet and by the development of complete practical diets which, when used either alone or supplements to sow's milk will produce normal growth in pigs from birth to normal weaning time.

An. Ind. 1, coop. ADA

Ohio Antibiotics, B₁₂, B Vitamin Supplements, and Cobalt for Feeding with Different Levels of Soybean Oil Meal to Pigs in Dry Lot. To (1) study effect of an antibiotic, B₁₂, other B vitamins and cobalt in minerals with different amounts of protein concentrate, (2) find desirable level of protein with rations adequate in minerals and vitamins for growing and fattening pigs when rapidity and economy of gains, and leanness or quality of product are considered, (3) obtain data on feeding of B₁₂ and antibiotic supplements with protein concentrates, and mixtures of the two, (4) compare performance of pigs given feeds rich in B vitamins, and pigs given B vitamin concentrates with corn and soybean oil meal rations, and (5) obtain data on effect of different protein levels without and with B₁₂ and antibiotic supplements on leanness and carcass quality.

An. Sci. 11

Ohio Improving the Feeds and Feeding Practices Related to The Raising of Baby Pigs on Synthetic Milk. To improve methods of feeding and management of baby pigs removed from the sow, giving special attention to (1) source of protein to replace all or part of dried skim milk now used in synthetic milks for pigs; (2) requirements of baby pigs for various feed nutrients; and (3) ways to improve composition of pig starters and how to increase their early consumption.

An. Sci. 56

Texas An Evaluation of Animal and Vegetable Protein Feeds With Respect to Chemical Composition and Feeding Value. To (1) determine cystine content of farm feeds and human foods, (2) develop method for stabilization of tyrosine during hydrolysis of food materials for amino acid assay, (3) determine tyrosine content of farm feeds and human foods, (4) improve microbiological methods for determination of amino acids and to adapt these methods to rapid analysis of the large number of samples necessary in feed control work.

Biochem. and Nutr., An. Husb. 521

W. Va. Nutritional Requirements of Swine for Growth. To (1) evaluate efficiency of supplementing swine rations composed of commonly used feedstuffs with known recognized vitamins; (2) evaluate various crude vitamin carriers as sources of unrecognized nutritional factors for swine; and (3) study effect of antibiotics in swine rations.

An. Husb. 62

W. Va. Nutritional Requirements of the Brood Sow. To study requirement of brood sow for (1) unrecognized nutritional factors needed for optimum performance, and (2) determine value of ration fortification with certain known required vitamins.

An. Husb. 64

B. Pasture and Forage

Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin, and combinations) and fibrous feeds, by rats, pigs, cattle, and sheep through use of ad libitum and paired feedings, N balance, and digestibility; (2) make chemical studies on methods of analysis and isolation of fibers; and (3) apply findings to the utilization of forage.

An. Husb., Eng., Agron. 1569

Ga. Fattening Swine on Green Grazing. To determine (1) value of green grazing for fattening swine, and (2) amount of grain necessary to produce maximum and cheapest gains on fattening hogs while on green grazing.

An. Ind., Chem. 30

Idaho Dehydrated Alfalfa Hay vs. Chopped Sun-Cured Alfalfa Hay for Swine Reproduction and Lactation. To compare relative feeding value, when fed at various levels, of dehydrated alfalfa hay and chopped sun-cured alfalfa hay for swine reproduction and lactation.

An. Husb., Vet. Sci., Chem. 151 A

- Ind. Effects of Various High-Roughage Gestation Rations on the Birth Weight, Livability, and Growth Rate of Newborn Pigs. Learn nutrition factors contributing to livability and growth rate of newborn pigs when sows are fed high roughage during gestation. Study value of different silages as to amount of grain that these will replace as well as supplementary nutrients needed to balance these silage rations.
An. Husb. 845
- Ia. The Value of An All-Year Grazing Program on the Reproductive Performance of Swine. To determine value of an all-year grazing program for swine selected for breeding animals at weaning age and maintained through puberty, gestation, parturition, and lactation.
An. Ind. 811
- Nebr. Nutrients Furnished Growing-Fattening Pigs by Good Quality Legume, Bromegrass-Legume, Or Rye Pasture. To determine (1) capacity of high quality forage for wholly or partially supplementing energy portion of swine rations from standpoint of protein, vitamin A, and water soluble vitamins; (2) relative feed replacement value of pasture under full and limited feeding programs; (3) effect of maximum use of forage upon carcass quality in swine; and (4) effect of adding trace minerals, antibiotics, surfactants, and other such materials to good rations upon performance of growing-fattening pigs; and to determine if use of such materials causes a sparing effect for certain nutrients.
An. Husb., Biochem. and Nutr. 427
- Nev. Alfalfa for Pig Feed. To determine maximum amounts of ground alfalfa that can be efficiently fed for pork production.
An. Husb., Chem. 41, coop. ARS
- N. Car. Utilization of Ladino Clover Pasture by Swine. To study use of Ladino clover pasture by swine by (1) grazing trials in which Ladino clover pasture will be used as either partial or complete replacement for protein concentrate and for grain, and (2) digestibility trials.
An. Ind. 63

Ohio

Pastures and Their Supplement for Pigs. To (1) get data on relative performance, returns, and killing qualities of March and April farrowed pigs that are full fed, and of January or February farrowed pigs that are started earlier and given a limited amount of feed on pasture so the two groups will finish at about the same time, (2) obtain further data on amount of protein concentrate needed by full fed spring pigs on Ladino clover or alfalfa pasture, (3) compare different pastures, as bluegrass, red clover, alfalfa, Ladino clover, mixture of legumes, meadow mixture, annual or emergency pastures, and (4) compare feeding in dry lot and on pasture.

An. Sci. 44

Ohio

The Nutritive Value of Cured or Dehydrated Legumes in the Dry Lot Breeding and Gestation Diet for Swine. To (1) further determine the nutritive value of dehydrated or cured legumes in the breeding and gestation ration for swine, (2) learn nature of physiological response, relative to female reproductive performance, affected by the consumption of legumes, (3) study ways of supplying nutrient factors furnished by legumes to breeding and gestating diets containing no green forage material.

An. Sci. 136

Utah

Carcass Characteristics and Feed Lot Performance of Three Strains of Swine Fed Various Levels of Alfalfa Meal and Barley. To study (1) influence upon carcass and on rate and efficiency of gains that results when level of alfalfa meal is varied from a low of 10% to a high of 50% with accompanying changes in barley levels, (2) interrelationship of breeding, represented by Durocs, Yorkshires, and a strain developed from a cross of the two breeds, and feeding, as associated with rations containing various levels of alfalfa and barley, upon carcass characteristics.

An. Husb. 461

C. Concentrates

- Fla. Feeding Waste Beef Tallow to Peanut-Fed Swine to Harden Their Fat. Learn effectiveness of waste beef tallow in hardening fats of peanut-fed swine.
An. Husb. and Nutr. 739
- Ga. Oil Seed Meals in Swine Rations. To determine (1) the necessary supplements for efficient utilization of cotton seed meal, low in gossypol, and (2) supplements necessary for utilization of peanut and other oil seed meals.
An. Ind., Chem. 6
- Ga. A Comparison of Various Pig Starter Rations for Creep-Feeding During the Pre-Weaning Period. To (1) determine level of rolled oat groats which can be used most economically in a creep ration; and (2) study value of dried skim-milk as a component of pig starter rations.
An. Husb. 58
- Ga. The Protein Requirements of Weanling Pigs in the Presence of Supplements Containing Antibiotics and Methionine. To determine optimum level of protein in the diet of weanling pigs with and without supplementation with antibiotics and methionine.
An. Husb. 59
- Haw. Studies to Determine the Nutritive Value and the Metabolism of Products and By-Products of Hawaiian Industry. Seek information relative to value of products and by-products of Hawaiian agriculture and industry for livestock feeding with major emphasis on use of molasses, sugar cane bagasse and pineapple by-products by chemical analysis of feeds to be used; learn digestibility; feeding trials to assess production response accompanied by studies of nutrient absorption, nutrient, and metabolite levels in blood and urine, metabolism, and its relation to requirements for specific nutrients.
An. Husb., Agron. 269

- Ill. The Nutritive Value of Grains Grown Upon Rich and Poor Soils. To complete analyses of samples now on hand, statistical analyses of data accumulated over past several years and publication of the results.

An. Sci. 20-355

- Iowa Rations and Other Factors Concerned in Growing and Fattening Pigs. To (1) determine fundamental nutritive requirements of swine and practical requirements under pasture and drylot feeding conditions, (2) determine how to improve efficiency of corn-soybean oil meal ration for growing-fattening pigs in drylot and on pasture, (3) compare efficacy of pasture vs. drylot production of growing-fattening hogs, and (4) study effects of different rations upon carcass quality.

An. Husb. 930

- Ia. Swine Feeding. 2. To Study the Growth-Promoting Effects of Different Levels of Protein Supplements for Growing-Fattening Pigs. 3. To Determine the Effects of Indispensable Amino Acid Supplementation (Lysine, Tryptophane, Methionine) on the Value of Certain Protein Supplements for Growing-Fattening Swine. (2) To determine most effective level of various protein supplements to feed for maximum growth in young pigs. (3) To determine amino acid deficiencies of protein feedstuffs for swine by supplementing these feedstuffs with indispensable amino acids such as lysine, tryptophane, and methionine.

An. Ind., Poul. Ind. 761-2, 3

- Miss. A Comparison of Methods of Seeding Corn and Soybeans to Be Hogged-Off With and Without a Protein Supplement. To determine relative value of different seeding rates and combinations of corn and soybeans when hogged-off, with and without a protein supplement.

An. Husb. FE-4

- Miss. A Study of the Factors Influencing the Quality of Tankage When Fed to Swine as a Protein Supplement. (1) Study factors influencing quality or nutritional value of tankages. (2) Correlate microscopic examinations, pepsin digestion, and/or N solubility with protein value of tankage.

Chem., An. Husb. FE-11

Miss. A Comparison of Soybean Meal with Degossypolized Cotton-Seed Meal With and Without Supplemented Amino Acids as a Protein Supplement for Swine. To determine relative value of degossypolized cottonseed meal and soybean meal as a protein supplement for swine, and study effects of supplemented amino acids upon these rations.

-An. Husb. PE-2

Mont. Supplements to Swine Rations Based on Feeds Common to Montana. I. Supplements for growth and fattening. To determine (1) value in swine fattening rations of an animal protein factor concentrate containing vitamin B-12 and antibiotics in (a) supplementing ration based largely on barley, linseed meal, and meat meal, and (b) replacing part and all of animal protein source with plant protein and APF concentrate; and (2) compare high-quality sun-cured alfalfa meal with dehydrated alfalfa meal in swine fattening rations. II. Supplements for reproduction and lactation. To compare gestation-lactation performance of brood sows on a basal ration supplemented with (a) sun-cured alfalfa meal (high quality second cutting), (b) sun-cured alfalfa meal plus APF concentrate; and (c) dehydrated alfalfa meal.

An. Ind. and Rge. Mgt., Vet. Res. Lab. 101, coop. Ext. Serv.

Nebr. Protein and Amino Acid Studies with Swine. To determine (1) qualitative and quantitative amino acid requirements of growing-fattening swine; (2) ability of various natural protein supplemental feeds to furnish these essential amino acids, and ability of the natural protein supplemental feeds to supplement one another in meeting amino acid requirements of growing-fattening pigs; and (3) effect of certain dietary factors upon protein requirements of growing-fattening pigs.

An. Husb., Biochem. and Nutr. 386-a

N. D. Gestation Rations for Swine. To ascertain (1) if gestation rations, formulated from N. D. feedstuffs, bulked up with alfalfa to permit self feeding, need additional vitamin supplementation as measured by weight and livability of litters; (2) protein quality improvement by additions of animal proteins and/or amino acids; (3) value of barley and oats as replacements for corn in rations; (4) if "complete" creep rations are superior to "simple" creep rations such as hulled oats; and (5) ascertain if pelleted creep rations are superior to ground grain rations, or if additions of about 5% fat will enhance sufficiently palatability of ground mixtures.

An. Ind. 14-I-A-1

- N. D. Pelleted Feeds for Swine. To study value of pelleting
barley for growing fattening pigs.
An. Ind. 14-I-B-1
- P. R. The Utilization of Concentrates in the Feeding of
Livestock in Puerto Rico. To determine most economical
quantities and qualities of concentrate feeds or grain
mixtures that may be used satisfactorily for milk, meat,
and egg production.
An. Husb. 51
- S. Car. Cottonseed Meal and Certain Antibiotics in the Ration
of Fattening Swine. To determine (1) relative feeding values
of cottonseed meals made at different temperatures and by
different methods; and (2) effect of B₁₂ and certain anti-
biotics when added to all-vegetable rations for fattening
swine.
An. Husb. 32, coop. So. Reg. Res. Lab.
- Texas A Study of Cottonseed Meal as a Feed in Swine Nutrition.
Cottonseed meal will be prepared by use of different solvents
and under different processing conditions. Preparations will
be examined chemically for their gossypol content. Studies
on nutritional value of different meals will be carried out
first with small animals and later with swine. Experiments
will be conducted to determine conditions necessary for the
inactivation or detoxification of gossypol in meal prepared
by use of these solvents. Attempt made to perfect a modifi-
cation of colorimetric method for the determination of gossypol
which will permit completion of an analysis within 20 minutes.
Experiments will be conducted to establish whether gossypol is
the only chemical compound in cottonseed which adversely
affects the nutritional value of cottonseal meal. This investi-
gation involves the chemical treatment of extracts of cottonseed
for the selective removal of gossypol, and small animal feeding
tests on resulting material.
An. Husb., Biochem. and Nutr. 438

D. Feed Adjuvants

- Calif. The Effects of Hormones on the Growth and Fattening of Meat Animals. To learn (1) types of hormones best suited for increasing growth or carcass quality, (2) most effective dose, (3) influence of age, sex, and dietary conditions on effect of treatment, (4) mechanism by which hormones influence metabolic activities.
An. Husb. 1662, coop. Ext. Service
- Ga. The Effects of Feeding an Antibiotic on the Reproductive Performance of Brood Sows over Several Generations. To (1) determine effects of feeding an antibiotic to sows during gestation-lactation with respect to litter size, birth weights, weaning weights, and number of pigs weaned per litter; and (2) conduct investigation over several generations to study any effects on life cycle reproductive performance of sows.
An. Husb. 57
- Ind. Iodine Requirements of Animals and Factors Which Influence Iodine Utilization. (1) Learn requirements of laying hens and effect of prolonged I deficiency. (2) Isolate, characterize, and determine mode of action of substances from certain feeds which modify thyroid activity of rats and young chickens.
Biochem., Poul. Sci., An. Husb. 832
- Kans. Meat Investigations---Influence of Feeding Antibiotics on Carcass Quality of Hogs. To determine manner of growth and fat deposit resulting from feeding antibiotics to growing-fattening pigs by making detailed carcass studies of hogs fed antibiotics.
An. Husb. 217
- Ky. High Levels of Chlortetracycline for Growing and Fattening Pigs. Study effect of feeding higher than normally recommended levels of chlortetracycline to growing-fattening pigs.
An. Ind. 88
- Nebr. Antibiotics in Swine Nutrition. To (1) further study value of antibiotics, combinations of antibiotics, and other growth stimulants in promoting increased gains of growing-fattening swine; (2) determine proper levels of antibiotics for addition to rations of growing-fattening swine; and (3) further investigate effect of feeding antibiotics upon carcass quality--thickness of backfat, percent primal cuts, curing qualities, etc.
An. Husb. 386-C

- Pa. The Feeding of Hormone and Hormone-like Materials to Swine. To study the effect of feeding graded levels of diethylstilbestrol or methyl testosterone to pigs during the growing and fattening period on (1) rate of gain and efficiency of feed utilization, (2) certain standard carcass measurements at market weights, and (3) the subsequent reproductive performance of gilts and boars.
An. Husb., Chem., Vet. Sci. 882-B
- Pa. The Role of Antibiotics in Protein Metabolism and Growth. To investigate effect of antibiotics on amino acid requirements, utilization of non-protein N, and metabolism of monogastric animals.
An. Nutr. 1219
- Tenn. Studies of Endocrine Relationships in Farm Animals.
A. Swine. To study effects of stilbestrol on growth rate, feed use, and carcass characteristics in swine.
An. Husb. 42-A
- E. Minerals
- Fla. Investigation of Mineral Nutrition Problems of Livestock Through the Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral interrelationships that occur in farm livestock, using suitable laboratory animals.
An. Husb. & Nutr. 346
- Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
An. Husb. & Nutr. 566
- Ohio The Influence of Mineral Ions on Pancreatic Digestion. To (1) study relationship of dietary trace mineral elements, especially Mn, to protein digestion efficiency in monogastric animals, and (2) investigate further the apparent protective action of Mn and Ca on proteolytic enzymes of the pancreas in vitro.
An. Sci. 2

- Pa. Efficient Feed Mixtures for Swine. A. Soft Phosphate with Colloidal Clay as a Source of Phosphorus in Swine Feeds.
To determine usefulness of soft phosphate with colloidal clay as a source of phosphorus in feed for various classes of swine.
An. Husb., Chem. 882-A
- Tenn. Mineral Metabolism in Animals. I. Absorption, Distribution, and Physiological Behavior of Calcium and Phosphorus in Farm Animals. To determine the normal distribution of these mineral isotopes administered by the various routes to cattle, swine, and sheep, and to study thereby in detail the normal absorption, utilization, and skeletal metabolism of selected minerals in these animals; (2) measure endogenous losses of calcium and phosphorus and from these values determine maintenance requirements in the various species as a function of age; (3) determine the biological availability of calcium and phosphorus from the common dietary sources of ruminants, and simple stomached animals; and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc., upon the availability; and (4) apply radioisotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.
An. Husb. 52, coop. AEC
- Tenn. Mineral Metabolism in Animals. II. Interrelationships of Calcium and Phosphorus with Vitamins, Minerals, Hormones, and Other Factors. To (1) investigate and separate effect of metabolism of calcium and P certain important factors which are known to influence their behavior in the animal body; and (2) study such elements and substances as are known to induce abnormal bone metabolism that are important for clarification of normal mechanisms and to aid in explanation of toxicological properties.
An. Husb. 53, coop. AEC
- Wis. Mineral Metabolism and Mineral Requirements of Animals.
To study (1) the effect of mineral supplements of various kinds on animals fed low lime rations, (2) the role of inorganic compounds containing such elements as iron, copper, nickel, cobalt, zinc, and manganese, and (3) factors responsible for nutritional anemia and effect of various inorganic elements and compounds in correcting such anemias. Fundamental investigations on the phenomena of hemoglobin building on the body will be continued.
Biochem., An. Husb. 8

F. Vitamins

- Ala. The Tocopherol Content of Feeds and Forages and the Significance of Vitamin E in the Nutrition of Farm Animals. To (1) determine concentrations of total tocopherol, alpha tocopherol, and unsaturated fatty acids in representative feeds, feeding stuffs, and forages, as influenced by stage of maturity, environmental conditions, and processing or treatment and storage; (2) survey blood serum levels of tocopherol, unsaturated fatty acids, and vitamin A in cattle and sheep under various feeding practices, in various diseases; (3) determine influence of diet and dietary factors on development and cure of nutritional muscular dystrophy in rabbits and of "white muscle disease" in cattle; (4) ascertain cause and nature of lightened, slate-grey color of muscle in "white muscle disease," and analogous condition in rats and rabbits; and (5) determine if vitamin E is important in swine nutrition.
An. Husb. 323
- Ill. Effect of Environment on the Vitamin Requirements of Swine and Poultry. To determine (1) extent environmental temperature and humidity modify requirements of the pig and chicken for vitamins, particularly B-complex; and (2) metabolism of the vitamins under hot and cool conditions.
An. Sci. 20-326
- Ill. Vitamin E Deficiency in Swine. Try to produce vitamin E deficiency initially in baby pigs, and, if successful, produce deficiency in growing and mature pigs. To characterize physiological, histological, and biochemical lesions produced by a vitamin E deficiency in swine. Study effect of antioxidants in prevention and/or cure.
An. Sci. 20-356
- Kans. The Metabolism of Carotenoid Pigments and Vitamin A in Swine. I. The Relative Efficiency of Vitamin A and Carotene for Reproduction in the Sow. To determine how effectively sows utilize carotene, when fed at various levels, for meeting vitamin A requirements for reproduction.
An. Husb., Chem. 311-I

- Nebr. Vitamin Studies with Growing-Fattening Swine. To (1) re-evaluate requirements of growing-fattening swine for certain of the B-vitamins; (2) determine vitamin deficiencies of natural feedstuffs and extent to which natural feedstuffs can supplement one another in meeting B-vitamin requirements of growing-fattening swine; (3) study effect of certain dietary factors such as antibiotics and trace minerals, upon B-vitamin requirements of growing-fattening swine; and (4) make preliminary observations on likelihood of a B-vitamin imbalance in formulation of diets for growing-fattening swine.
An. Husb. 386-b
- Ohio The Effect of Adsorbents and Minerals on the Determination of Riboflavin and Other B-Complex Vitamins and on Their Availability to Animals. To (1) determine effect of adsorbents and minerals on present accepted methods of assaying for riboflavin and other B-complex vitamins; and (2) study effect of adsorbents and other B-complex vitamins to animals.
An. Sci. 3
- Pa. A Study of the Interrelationships of Pyridoxine (Vitamin B₆) With Certain Organic and Inorganic Nutrients. Learn effect of experimentally induced B₆ deficiency on metabolism of minerals and of certain energy supplying nutrients in rats.
An. Nutr., An. Husb. 1264
- Texas The Metabolic Interrelationship of Vitamins and Amino Acids in Swine. To determine the effect of (1) dietary level of methionine and lysine on metabolism of these and other amino acids in growing pigs; and (2) adequate and inadequate levels of each vitamin, pyridoxine, pantothenic acid, niacin, folic acid, biotin, and vitamin B₁₂ on metabolism of amino acids in growing pigs.
Biochem. and Nutr., An. Husb. 962
- Wis. The Effect of Vitamins and Other Organic Nutrients on the Growth, Milk Production, and Reproduction of Animals. To determine factors concerned with the adequate nutrition of farm animals as related to Wisconsin conditions.
Biochem., An. Husb. 10

Wash. The Vitamin and Other Substances Required in Minute Amounts by the Pig for Growth, Reproduction, and Lactation. To determine (1) effect of deficiencies of vitamins, or other substances needed in minute amounts, on growth, reproduction, and lactation; (2) role of specific vitamins or substances in nutrition; (3) application of findings with purified diets to practical rations fed under farm conditions; and (4) effect of dietary variations on tissues and organs.
An. Husb. 1117

G. Management

Ala. Improvement and Evaluation of Field and Confinement Systems of Pork Production. To (1) study factors related to efficiency of pork production in field system with maximum use of grazing crops and hogging-off of fattening crops; (2) study factors in efficiency of pork production in confinement system with all rations supplied in feeders; and (3) apply principles learned above and determine if market hogs may be most efficiently produced in field or confinement system.
An. Husb. 421

Calif. Effect of Environment on the Production of Swine.
II. Reaction of Swine of Various Ages, Weights, and Plane of Nutrition to Variations in Temperature, Humidity, and Other Factors. To investigate (1) temperature and humidity at which pigs grow and fatten most rapidly and economically, (2) under what conditions their cooling systems fail, (3) effect of low temperature and humidity changes on food consumption, growth, and fattening, (4) factors affecting pigs' ability to withstand extremes of temperature and humidity, (5) effect of extreme changes on metabolism and other body functions, and (6) how results can be used in management and practices of pork production.
An. Husb. 969-A

Ind. The Effect of Cooling on the Growth of Swine.
To determine effectiveness of (1) various types of artificial shade; (2) refrigerated slab; (3) refrigerated drinking water; and (4) water application to surface of swine.

An. Husb., Engin., Vet. Sci. 727

Wis. Development of Swine Management and Housing Practices Which Reduce Soil and Water Losses on Sloping Land. To (1) determine most profitable use of pasture and high quality roughages in swine production; (2) determine what soil conserving practices are necessary to accommodate swine production on land subject to erosion; (3) plan and construct special housing suited to cold weather farrowing as needed in research under this project; and (4) observe labor saving, housing, and management practices in swine production at all growth stages.

An. Husb., Agron., Soils, Engin. 911, coop. ARS

Carcass Evaluation and Processing

Ark. Factors Affecting the Preservation of Cured Pork.
To compare various methods of preservation of pork by the cures now available and determine the effects of such factors as elapse of time from slaughter until carcass is chilled, various methods of making carcass cuts, and relative humidity upon preservation of pork cuts in order to determine best methods of curing and handling cured pork.

An. Ind. and Vet. Sci. 336

Ind. The Influence of Diet on the Ratio of Lean to Fat in Hog Carcasses. To determine (1) effect of diet on composition of hog carcasses with emphasis on ratio of lean to fat, (2) influence of any diets producing high proportion of lean to fat on efficiency of producing pork, and (3) relationship of age and weight to composition of hog carcasses.

An. Husb. 538

- Iowa The Influence of Dietary Supplementation Selection and Breeding on Carcass Quality and Tissue Composition of Meat Animals. To (1) determine effects of protein, fat, antibiotics, trace minerals, calcium and phosphorus of swine rations on carcass quality and tissue composition; (2) effect of roughage, protein and protein substitutes, and hormones on quality of lamb and beef carcasses; and (3) make additional studies, largely biochemical, to support objectives above.
An. Husb. 1239
- Ky. A Study of the Keeping Quality and Shrinkage of Cured Pork from Hogs of Different Degrees of Fatness. To (1) study relative cut out values of pork carcasses from hogs of different degrees of fatness; and (2) determine shrinkage, keeping ability, and rancidity development of cuts from such carcasses.
An. Ind. 68
- Ky. A Study of Ham Spoilage. To study curing methods that protect pork against proteolytic spore-forming anaerobes and any other bacteria which may be found.
An. Ind., An. Path. 70
- Mich. The Relationship Between Growth, Feed Efficiency, and Carcass Characteristics. To (1) determine variation in feed efficiency between hogs by individual feeding methods; (2) effect of feed restriction on feed efficiency and carcass characteristics; and (3) study methods of restricting feed intake.
An. Husb., Chem. 42
- Mo. Improved Methods of Pork Carcass Evaluation. Develop method for estimating carcass and cut out values in terms of monetary units by expressing the value of the primal cuts, fat cuts, and trim fat based on the Chicago monthly price and using a predictive estimate to project the increased demand for lean cuts.
An. Husb. 88
- N. Car. Determination of Objective Measurements of Flavor of Aged Country Hams. Evaluate units of measurements developed in prediction equation used in expressing aged ham flavor.
An. Ind., Econ., Home Econ. M19

- N. Car. Microbiological and Chemical Changes Occurring in the Curing of Meat. To ascertain the role played by micro-organisms and to follow certain changes occurring in the curing of meat.
An. Ind. 17
- Pa. High Temperature Curing (Hot Cure) of Pork. To determine (1) conditions necessary for properly curing chilled and unchilled hams and bellies by the hot cure method, and (2) holding qualities of cured and smoked product in (a) zero storage, (b) 40° F. storage, and (c) under farm storage (70-80° F.) conditions.
An. Husb., Chem. 1169
- Tenn. Carcass Yield Investigations with Pork. To (1) determine yield difference of cured bacon produced from various weights, types, and grades of hogs; (2) determine further the effect of type and weight upon carcass grade and yield; (3) investigate possibility of developing and using photographic standards for objectively grading primal cuts of pork; and (4) study softness and lean color of pork as it affects shrinkage and organoleptic tests.
Home Econ., An. Husb. 30
- Va. Processing and Merchandising Meats from Animals Produced Under Virginia Farm Conditions. Investigate procedure and develop ways of processing and merchandising meats from cattle and sheep produced under Virginia farm conditions, hogs fed, managed, and bred so as to increase ratio of lean to fat in carcass. Devise means of estimating carcass value in live animals; develop procedures for more precise evaluation of carcasses from meat animals in breeding, feeding, and management research. Investigate methods of curing and storing home meat supplies.
An. Husb., Home Econ. and Rural Soc. 8455

Wash. Comparative Carcass Evaluation, Marketing Differentials, and Consumer Acceptance of Meat and Fat Type Hogs. To (1) learn by laboratory methods the component proportions of lean, fat, and waste in carcasses of meat and fat type hogs at slaughter weights associated with common market grades, (2) evaluate at packer and retail level the processing costs and wastes associated with selected slaughter weights for both types hogs, and (3) test consumer acceptance and market response to selected cuts from carcasses of different weight groups for both types hogs at a. same prices, and b. different prices.

Econ., Home Econ., An. Husb. ES 399

Wash. Factors Influencing the Desirability and Nutrient Content of Meat and Meat Animals for Human Consumption. To determine effects of (1) genetics, nutrition, and other factors on carcass quality of meat animals and on quality and nutrient content of meat; and (2) storage, processing and preservation on quality, nutrient content, physical structure, and economic value of meat and meat products.

An. Husb. 1161

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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

April 1956

DAIRY CATTLE

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

DAIRY HUSBANDRY

Animal Breeding

- Ark. The Development of Strains of Dairy Cattle for the Improvement of Dairy Cattle in Arkansas and the Southern Region. To breed new and improved strains of dairy cattle within present purebred breeds that are more highly adapted to and more efficient under the conditions prevailing in Arkansas than are purebred cattle now available.
An. Ind. Vet. 314, (S-3)
- Calif.
(Davis) Qualitative and Quantitative Inheritance in Animals. Effect of genetic and environmental factors on milk and butterfat yield in dairy cattle.
A.H. 939
- Ga. The Use of Purebred Jersey and Red Sindhi Cattle to Produce Strains Better Suited to Feed and Climatic Conditions of the Lower Coastal Plain Area of the Southeast. To determine (1) through breeding trials and production tests if the heat tolerance of the Red Sindhi in varying amounts can be used effectively to raise the milk production level of dairy cattle in the lower Coastal Plain area and (2) the optimum percentage of Red Sindhi breeding to be used for this purpose.
An. Ind. 72, (S-3), Coop. USDA
- Idaho Causes of Variation in the Fat and Solids-Not-Fat Content of Milk. To determine (1) influence of breeds, herds, cows, yearly environmental changes, seasons, stage of lactation, pregnancy, and age of cow on the fat solids-not-fat content of milk; (2) value of the formalin titration test and the lactometer for relationship; and (3) develop a selection index for fat and solids-not-fat production that will maximize genetic gain in both traits.
D. H. 180
- Idaho Causes and Prevention of Breeding Failures in Dairy Cattle. To (1) study pre-natal carotene (vitamin A) nutrition on post-natal performance -- to determine effects of feeding supplementary amounts of vitamin A & beta carotene on breeding efficiency of both males & females, and (2) study inheritance & environment as related to breeding performance in dairy cattle.
D.H., Vet. Sci., Ag. Chem. 9, (W-2)
- Ind. The Improvement of Dairy Cattle Through Crossbreeding. To determine possible heterosis or hybrid vigor in cattle by comparing milk and beef producing qualities of crossbreds from Red Dane, Red Poll, and Milking Shorthorn with purebred animals of same three breeds produced by same sires.
D. H. 464 (NC-2)

- Iowa Improvement of Dairy Cattle Through Breeding. To (1) develop and improve techniques for predicting and proving transmitting and producing ability of dairy cattle, (2) determine relative value of inbreeding, crossbreeding, and outbreeding for developing improved strains of dairy cattle, and (3) determine inheritance of production fertility, and physical characters.
An. Br., D.H. 1053 (NC-2) Coop. BDI
- Ill. Studies of the Inheritance of Production Characteristics of Dairy Cattle by Crossbreeding. To (1) determine possible occurrence of hybrid vigor by crossing two breeds of dairy cattle, with main emphasis on milk & butterfat production, and (2) observe genetic behavior of various other physical characteristics of animals, & making estimates of their heritability.
Dairy Sci. 35-306, (NC-2) Coop. BDI
- La. Development of Strains of Dairy Cattle Especially Adapted to Southern Conditions. To (1) develop more accurate & efficient measures of heat tolerance in dairy cattle, (2) determine relationship of basic animal characteristics both anatomical & physiological to heat tolerance, and (3) evaluate differences in heat tolerance among various strains within European breeds.
Dairy 607, (S-3) Coop. BDI
- Mich. Investigation of Heritable Characteristics of Jersey Cattle. To investigate certain dairy cattle characteristics such as vigor and longevity, reproduction, growth, development, feed utilization, yield and composition of milk and physiology and/or biochemistry of certain phases of the above characteristics.
Dairy 102, (NC-2)
- Minn. Identical Twins Versus Calves of Lesser Relation in Dairy Production Research. To (1) determine actual numbers of identical twins and triplets needed to obtain acceptable results in studies of various dairy cattle characteristics, and (2) explore usefulness of fraternal twins as compared to usefulness of identical pairs.
D.H. 1610
- Minn. Inheritance in Dairy Cattle. 3. Production Testing and Environment Studies in Dairy Herds. To (1) determine if the reliability of predicting a sire's performance in particular herds can be increased by applying currently suggested methods of adjusting records for within and between herd environment, and (2) derive still more reliable estimates of environment effects on production records.
D.H. 1616-3
- Minn. Fixation of Milk Production Characteristics by Breeding. To (1) build superior lines of inbred animals in breeds at branch stations participating, with lines to become reservoirs of superior stock, (2) study incrossing, after superior inbred lines are developed, and (3) determine dependability of sire-evaluating methods from work conducted in herds of cooperating dairymen & giving needed data.
D.H. 1617, (NC-2) Coop. BDI

- Mo. Improvement of Dairy Cattle Through Breeding. a. A Study of Mating Systems and Related Factors as they Influence Production, Reproduction and Physical Characteristics of Dairy Cattle. To study influence of certain mating systems and related factors on production, reproduction and physical characteristics in dairy cattle.
D.H. 35-a (NC-2)
- Nebr. The Development and Use of Holstein-Friesian Cattle with High Efficiency for Milk and Butterfat Production. To (1) develop dairy cattle that efficiently transform feed into milk and butterfat, (2) develop and improve techniques for predicting the producing and transmitting ability of the cattle, and (3) determine hereditary and environmental relationships of physiological and physical characters in dairy cattle.
D.H. 318 (NC-2) coop. BDI
- N.C. Improvement of Dairy Cattle Through Selection. Develop selection methods & means for economic traits as production & heat tolerance to permit maximum genetic improvement from selection. Assess progress realized from selection in herd using artificial insemination with unselected herd.
Stat. D.I. 31 (S-3) Coop. DHRB
- Ohio The Effectiveness of Reciprocal Crossing in Blending and Fixing the Desirable Dairy Characteristics of Various Families of Holstein-Friesian Cattle. To study effectiveness of reciprocal crossing and inbreeding in blending and fixing desirable characteristics in families of Holstein cattle from which sires will be chosen for proving subsequent distribution.
Dairy Ind. 15, (NC-2) Coop. BDI and Ohio Pub. Welfare
- Ohio A Study of the Cellular Antigens in the Blood of Cattle. Study inheritance of cellular antigens and determine if antigens are closely associated with high milk production.
D.I. 7 (NC-2)
- Ohio The Use of Cattle Twins and Triplets to Study the Relative Influence of Inheritance and Management on Efficiency of Feed Utilization and Production. To determine heritable differences in feed utilization between full sisters compared with results of identical twins.
Dairy Sci. 36
- Ohio Evaluation of Criteria for Breeding, Selecting, and Culling of Dairy Animals. To determine value of "performance analysis" when used as standard for a method of breeding & selection.
Dairy Sci. 85-1
- P.R. The Development of a Cow, Adapted to Puerto Rico Which Will Produce Milk Economically Under Tropical Conditions. Animals of the San Sebastian strain will be held until production records have been obtained on their crossbred daughters.
A. H. 114 (S-3)

- R.I. Breeding Experiment with Dairy Cattle. To evaluate influence of inbreeding & outcrossing of Holstein dairy cattle trying to establish genetic factors; influence on total milk production & butterfat percentage; solids-not-fat content of milk; body type & confirmation; growth, persistence & longevity; reproduction efficiency.
A & D.H. 31
- S. D. Improvement of Dairy Cattle Through Breeding. To determine effect of twinning in dairy cattle, measuring its bearing on milk & butterfat production, reproductive efficiency, ultimate size, etc. (long time objectives).
D.H. 184
- Tenn. Development of Strains of Dairy Cattle Especially Adapted to Southern Conditions. To develop superior germ plasm and breeding methods for improving Southern dairy herds; to obtain the highest possible herd production with due regard for low unit cost under grazing conditions.
Dairy 24 (S-3)
- Texas The Use of European and Zebu Stocks to Produce a Strain of Dairy Cattle Better Suited to the Environmental Conditions of Texas and other Southern Areas. To (1) learn if heat & parasite tolerant qualities of Zebu cattle can combine and fix with high milk producing qualities of proved lines of a European breed, to produce a strain of superior adaptability to southern conditions & thus gain superior capacity & economy of production, (2) learn if crossbred individuals, as such, have superior merit, and (3) develop better practical measures of heat tolerance in dairy cattle.
D.H. Gen. 642 (S-3)
- Utah Improvement of Holstein and Jersey Dairy Cattle Thru Selection and the Use of Proved Sires. To expand sire proving program by putting sires in dairymen's herds on cooperative basis, and raise level of inheritance for high fertility, disease resistance, good disposition, early maturity, etc.
D. H. 235
- Wash. Inheritance and Environment as Related to Breeding Performances in Dairy Cattle. To determine importance of heredity in causing variation in various measures of breeding efficiency, and outline selection procedure for breeding efficiency, and estimate production days loss because of poor breeding efficiency.
Dairy Sci. 888 (W-2)
- W. Va. The Transmission of Milk and Butterfat Production and Body Conformation by Dairy Sires. To study more reliable methods for selection of young unproven sires.
Dairy Husb. 14 Coop. BDI

- W. Va. The Use of Type and Production Records as a Basis for a Dairy Cattle Improvement Program. To study (1) genetic portions of the variations in production of milk and butterfat, and (2) relation of age and percentage of butterfat in milk.
D. H. A. Ec. 45
- W. Va. Comparison of Young Bulls with Proven Bulls in Artificial Breeding. To apply and evaluate indexing procedure which has been developed for indexing unproven bulls &/or females that have not lactated.
D.H. 67
- Wis. Evaluation of Systems of Mating in Dairy Cattle. Under a standardized environment, to evaluate various systems of breeding for fixing or concentrating genes for desirable production-characteristics in dairy cattle and to determine how these characteristics are inherited.
D.H. Gen. 551 (NC-2) Coop. BDI

Reproduction and Artificial Insemination

- Alaska The Value of Light for Increasing Milk Production, Conception Rate and Number of Observed Estrus Cycles During the Alaska Winter Season. To determine if lengthening period of light to which Alaska cows are exposed during winter favorably affects milk production, conception rate and number of observed estrus cycles.
An. & Dairy Prod. AL-1-3-2-(R)
- Ark. Effects of Processing, Shipment, & Storage on the Livability of Dairy Sire Semen Under Arkansas Conditions. To develop adequate systems & improved practices for processing & transportation of dairy bull semen under conditions in southern states, particularly Arkansas, including studies of various methods of processing, packaging, handling, storing, & transporting dairy sire semen with reference to quality, liability, & impregnating ability.
An. Ind. Vet. Sci. 296
- Calif. Physiology of the Domestic Animals. To study the physiology
(Davis) of (1) reproduction, (2) control mechanism for the Ca level of the blood (3) study includes the hormonal levels at various reproductive states, and (4) the amount of parathyroid hormone secreted in open, pregnant and lactating cows, and the effect of the parathyroid hormone on the Ca level of the blood.
An. Husb. 941
- Calif. The Relation of the Pituitary, Hypothalamic Nuclei, and
(Davis) Adrenal Gland to Breeding Failure in Dairy Cattle. To (1) study nature of eosinophilic granules in glomerulosa of adrenal which increase in number during gestation in cattle, (2) make histological studies to determine cytology of adrenal pituitary & hypothalamic nuclei in normal & sterile animals, (3) make lab tests that for reliable measures of functional activity of adrenal gland in the cow, (4) screen adrenal hormones to find which compounds are important in reproduction, and (5) study functional activity of adrenal gland during estrous cycle, & pregnancy, and to develop assay methods for various hormones concerned in reproduction.
An. Husb. 1550 (W-2) Coop. USDA
- Colo. Cause and Treatment of Testis Failure in Sub-Fertile Bulls. To (1) investigate some basic factors in spontaneous testis failure, (2) establish criteria by which types of testis failure can be classified, and (3) employ and test available hormone preparation in attempts to correct such conditions.
An. Husb. 210 (W-2) Coop. BAE
- Fla. Transfer of Mineral Elements Through the Placenta and Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements and to determine distribution of those elements in the fetus.
An. Husb., Nutr. 566

- Ga. Some Effects of Various Hormone Treatments on Heifers Stimulated to Obtain Udder Growth Before Breeding and Upon Cows Artificially Induced to Lactate. To determine the effect of various treatments of four to ten month old dairy heifers with combinations of stilbestrol and progesterone upon the immediately observed and continued udder growth, sexual activity and breeding efficiency, udder and body conformation, and lactation yields following calving.
Vet. Med., Dairy 65
- Idaho Causes and Prevention of Breeding Failures in Dairy Cattle. To (1) Study pre-natal carotene (vitamin A) nutrition on post-natal performance, to determine effects of feeding supplementary amounts of vitamin A & beta carotene on breeding efficiency of both males & females, (2) study relation &/or interrelation of Ca, P, & vitamin D to reproduction and production, and (3) study inheritance & environment as related to breeding performance in dairy cattle.
D. H., Vet. Sci., Ag. Chem. 9 (W-2)
- Ill. The Metabolism of Spermatozoa and Its Control. To study metabolic pathways by which spermatozoa derive energy and determine factors influencing metabolism of spermatozoa with view to control of metabolic processes and of the length of fertile life.
Dairy Sci. 35-317
- Ill. Artificial Insemination and the Improvement of Fertility in Dairy Cattle. To improve conception rate of cattle bred by this practice & increase efficiency of method. Plans for work in future will be concerned with (1) Sperm production, (2) Semen preservation in vitro, and (3) effect of environment of sperm.
Dairy Sci. 35-316
- Ind. Studies on the Progestational Hormone in the Bovine. To determine (1) effects of progesterone on development & function of dairy cow's udder, (2) progestational activity of blood during estrus cycle & gestation, (3) approximate time corpus luteum must be active to maintain pregnancy, and (4) mode of elimination of progesterone.
Dairy Husb. 656
- Kans. A Study of Some Environmental and Physiological Factors Associated with Bovine Reproduction. To determine effects of estrual cycle and variations and associated pathological changes on reproductive efficiency.
Dairy Husb. 391
- Kans. Preservation of Bull Semen. To preserve semen (1) in a dried state, and (2) at low temperature.
Dairy Husb. 379
- Ky. The Effect of Delayed Fertilization on the Development of the Ovum of Repeat-Breeding Dairy Heifers. Learn if age of Ovum at time of fertilization has an effect on embryonic death rate in repeat-breeding dairy heifers.
Dairy Ind. 89

- La. Breeding Disorders. To (1) attempt to determine basic cause or causes for high anestrus rate found in La. cows, and (2) investigate effectiveness of various treatments in alleviating conditions found.
Dairy Husb., Vet. Sci. 765
- La. Effects of Air Movement and Air Movement Plus Sprinkling on Semen Productions, Fertility and Physiological Responses of Dairy Bulls under Southern Conditions. To develop practical management procedures for bulls which will result in production of good quality semen & high fertility during summer in the areas affected by high temperatures & high humidity.
Dairy 842
- Maine Causes and Prevention of Reproductive Failures in Dairy Cattle. To study (1) factors involved in retained placenta and (2) specific causes of breeding failures in individual cows.
An. Path. 31 (NE-1) Coop. BDI
- Mass. Causes and Prevention of Reproductive Failures in Dairy Cattle. To (1) obtain more complete picture of histological characteristics of bovine corpus luteum, cotyledon and placentome than is now available, (2) note more important changes occurring at various ages, at selected stages of estrous cycle, and during early pregnancy, and (3) compare histological pattern for normal cattle with appearance of tissues from animals with histories of breeding trouble.
An. Husb. 1000 (NE-1)
- Mass. Physiology and Reproduction of Dairy Cattle. To (1) investigate possible existence of pattern alterations in amino acids, proteins or other constituents in blood or urine associated with estrous cycle or gestation, (2) identify physiological processes in maintenance of corpus luteum thru course of pregnancy subsequent to conception, and (3) investigate effect of pre- & post-ovulatory environment on embryo survival thru use of embryo transplantation.
An. Husb. 1001
- Mich. The Relation of Physiological Development to the Performance of Dairy Cattle. To investigate interrelations of various body systems of dairy cattle and relation to productive characteristics, and test use of standards of physiological development in improving dairy cattle thru better selection, breeding, feeding and management.
Dairy, Physiol. 59
- Mich. A study of Reproductive Disorders of Livestock, Especially Cattle.
A Study in Cattle of Hormonal and Nutritional Factors Involved in Reproductive Disorders Thru Hormonal and Nutritional Therapy.
An. Path. Chem. Dairy Husb. 74
- Mich. A Study of the Effect of Hormones upon Bacteria found in the Reproductive Tract of Certain Farm Animals. To determine (1) physiological effect in vitro of gonadal hormones upon pathogens isolated from reproductive tract, and (2) same effects invivo of these hormones upon selected infected animals.
Bact. Phys. An. Path. 109

- Minn. A Study of the Use of Endocrines as a Means of Increasing and Maintaining Levels of Fertility in the Male. To (1) determine causes of low fertility in problem bulls used in artificial insemination & provide methods to increase their fertility levels, (2) develop management, feeding & semen collection methods to improve semen production in bulls for artificial insemination, (3) develop improvements in techniques & equipment for inseminating cows, and (4) develop satisfactory lab tests on semen samples to measure relative degree of fertility in bulls.
An. Husb. Dairy Husb., Vet. Med. 1411
- Mo. Biochemical, Physical, and Physiological Aspects in Natural and Artificial Breeding. To make a thorough study of the chemistry &/or biochemistry of male & female germ cells in order to gain knowledge which is needed as a basis for future investigations.
An. Husb. 81
- Mo. Increasing the Effectiveness of Artificial Insemination as a Means of Improving Dairy Cattle. -- a. A Study of Dairy Bull Semen, Via Chemical Characteristics. -- To study role of cations, energy transformation mechanisms & general metabolic reactions in spermatozoa viability & fertility, using data obtained to improve storage methods.
Dairy Husb. Chem. Vet. Med. An. Husb. 54-a
- Miss. Studies on the Physiology of Reproduction in Dairy Cattle. To (1) determine factors which appear to influence breeding efficiency in Mississippi dairy herds, (2) determine total number of sperm reaching various segments of reproductive tract at intervals after insemination, and (3) study histology of various parts of female reproductive tracts under a variety of physiological and pathological conditions.
Dairy FG-3
- Mont. A Study of the Urinary Estrogen Excretion by the Bovine. To (1) establish normal urinary estrogen excretion pattern during estrus cycle of the bovine, (2) determine effect of conception upon normal urinary estrogen excretion pattern, (3) determine if a relationship exists between urinary estrogen excretion rate & appearance of unstained smears of cervical mucus, and (4) determine effect of abnormal conditions upon normal urinary estrogen excretion.
Dairy Ind. 19, MS 920 (W-2)
- Nebr. The Normal Development of the Bovine Testes and Experimental Methods of Influencing this Development. To (1) determine normal developmental picture of testes with increasing age in the bovine, and (2) after this is obtained experimental factors such as hormone administration to influence development.
Dairy Husb. 453
- Nebr. Maintenance of Fertilizing Capacity Bovine Semen Over Long Periods of Storage and Methods of Evaluating Fertilizing Capacity.

- Nebr. To increase (1) time that semen can be stored after collection so that increased use of good sires can be practiced, and (2) efficiency of artificial breeding by decreasing number of bulls needed to operate a bull stud, thereby decreasing cost of breeding to the farmer.
Dairy Husb. 241
- N. H. The Effect of the Maximum Use of Roughage upon the Reproductive Efficiency of Dairy Cattle. To determine effect on the reproductive performance of dairy cattle of feeding roughage grown on a restricted area under intensive fertilization as the principal source of nutrients.
Dairy Husb. 14-A (NE-1)
- N.H. The Influence of Herd Management Practices on Milk Production, Efficiency of Reproduction, and Herd Replacement Maintenance. To study factors affecting (1) milk production such as association of month of freshening with milk production and with length of lactation, age with milk production, length of lactation with milk production, and length of dry period with milk production, (2) reproduction efficiency such as association of age of males and females with breeding efficiency, seasonal variation in breeding measured by conception rate, seasonal influence on frequency of oestrus, and inheritance as a factor, and (3) herd replacement such as fluctuation in sex ratio, mortality of young calves and normal replacement due to age, sickness, non-breeding, and other factors affecting heifers and cows.
Dairy Husb. 21
- N. H. The Relation of Seminal Fluid Fructose Levels to Factors Affecting Breeding Efficiency. To determine (1) what factors affect seminal fructose levels of dairy bulls, and (2) relationship between seminal fructose levels and reproductive performance of dairy bulls.
Dairy Husb. 29
- Nev. Chorionic Gonadotrophin of the Cow. To (1) characterize gonadotrophic hormone of bovine chorion, (2) attempt to detect gonadotrophin in blood &/or excreta of pregnant cow and (3) compare blood & urinary proteins in non-pregnant & pregnant cows.
Chem. An. Husb. 25
- Nev. Physiological Studies of Repeat-Breeding Cows. To (1) explore physiological and pathological disturbances underlying condition of repeat-breeding, and (2) develop satisfactory methods to prevent and treat this condition.
An. Husb. 94 (W-2)
- N. J. Studies on Causes and Prevention of Reproductive Failures in Dairy Cattle. Learn effect of various postpartum treatments upon the reproductive efficiency of dairy cows.
Dairy Ind. 137 (NE-1)

- N. J. A Study of the Usefulness of Blood Antigens in Breeding Methods of Dairy Cattle. To learn existing genetic association between presence or absence of antigens to reproductive factors & other characteristics.
Dairy Ind. 138 (NE-1)
- N.J. The Freezability of Semen from Dairy Bulls as Related to Procedures of Freezing, Semen Quality and Certain Physiological Characteristics of Bulls. Continue study of techniques of freezing semen, & study effects of thyroid activity.
Dairy Ind. 126
- NYC Studies on Causes and Prevention of Reproductive Failures in Dairy Cattle. A. The Assay of Body Fluids and Excreta of Dairy Cattle for Gonadic and Gonadotrophic Hormones. B. Genetic Aspects of Reproductive Performance in Dairy Cattle.
An. Husb. 128 RM-15, Coop. BDI
- NYC The Effects of Nutrition During Early Growth and Development, Especially the Effect of Prepubertal Nutrition, on the Mature Reproductive Performance of Dairy Cattle. To determine the effects of maximum, normal and restricted intake of an otherwise adequately balanced diet during early growth and development on the subsequent reproductive performance of dairy cattle.
An. Husb. 15-A (NE-1)
- NYC Factors Controlling Ovulation in the Cow. To find major factors involved in ovulation, and time at which it occurs in dairy cattle.
An. Husb. 15-E (NE-1)
- NYC A Study of the Factors Affecting Breeding Efficiency in 2000 Cooperating Herds in Artificial Breeding. To obtain breeding and calving data on a large sample of herds maintained under varying environmental conditions and determine what factors are associated with breeding problems.
An. Husb. 15-G (NE-1)
- NYC A Study of the Technique of Artificial Insemination of Farm Animals, Especially the Preservation of Stored Semen, and the Development of Methods for Increasing the Usefulness of Artificial Insemination in the Field. To develop methods of preserving the fertility of stored semen.
An. Husb. 71,
- N. C. Studies on Low Temperature (-79°C) Bovine Semen Storage. To determine (1) sodium citrate concentration that gives best results, (2) optimum final glycerol concentration, (3) effect of adding glycerol-diluter all at one time & over a period of time, (4) optimum equilibrating time of semen with glycerol prior to freezing, (5) optimum rate of lowering temperature from 5°C to -79°C (6) semen differences by sires, (7) interaction(s) between above factors, and (8) possibility of maintaining fertility in semen which has been frozen.
An. Ind. 29

- Okla. The Carotene Requirements of Holstein Cattle for Reproduction and Lactation. To (1) determine carotene requirements of Holstein cattle for successful reproduction and normal lactation, and (2) study further breed differences as to carotene requirements of dairy cattle.
Dairying, Chem. 287
- Oreg. The Importance of the Carotene (Provitamin A) Level in Prenatal and Subsequent Nutrition of the Calf on its Breeding Performance. To determine (1) level of carotene and/or vitamin A necessary to maintain high fertility and reproductive efficiency throughout the life of bulls and cows, and (2) value of carotene and/or vitamin A supplements in rations of difficult breeding cows and of bulls producing semen of low fertility.
Dairy Husb. 2-2 (W-2)
- Oreg. Sterility in Dairy Cattle. To investigate phases of sterility in dairy heifers and cows such as sterilities caused by possible infection.
Vet. Med. 136
- Oreg. The Measurement and Improvement of Fertility in Farm Animals.
1. The Evaluation of Semen Production and Libido in the Male Farm Animal. To determine (1) effect of chemical, physical, and bacteriological factors upon semen quality and fertility, and (2) effect of age and frequency of service on semen production and quality.
An. Husb. 155-1
- Oreg. The Measurement and Improvement of Fertility in Farm Animals.
(2) The Role of Hormones and Nutrition on Gamete Production, Prenatal Survival, Mating Response and the Estrual Cycle. To determine effect of the hormones, Progesterone, F. S. H., L. H., and Testosterone, on gamete production, fertilization rate, prenatal survival and mating response.
An. Husb. 155-2
- Oreg. The Measurement and Improvement of Fertility in Farm Animals.
3. The Effect of Breed, Season, Age and Management Upon Fertility. To determine (1) concurrence of estrus & ovulation in the postpartum female and its relation to subsequent fertility, (2) factors influencing age at puberty and relationship of age at puberty to subsequent fertility, and (3) effect of breed differences on breeding behavior and fertility in farm animals and the relationship of season to breed response.
An. Husb. 155-3

- Pa. The Nature of Infertility in Dairy Heifers. (1) Functionally normal, nulliparous heifers, which have been bred repeatedly will be used to determine: rate of fertilization 3 days after breeding, rate of embryonic mortality between 3rd and 34th days of pregnancy, and microbial flora of reproductive organs and semen used for insemination of these heifers, and (2) functionally normal and abnormal nulliparous heifers which have been bred repeatedly will be used to determine: frequency and proportional distribution of different types of genital abnormalities and histopathology of reproductive organs and thyroid, adrenal and pituitary glands.
Dairy Husb. An. Husb. 1143
- Pa. The Reproductive Capacity of Dairy Bulls as Influenced by Nutrition. To determine the effect of certain dietary factors upon (1) the development of sexual maturity in dairy bulls, (2) the reproductive performance of dairy bulls, with particular reference to the quantity and quality of the semen produced, and (3) the length of the useful reproductive life on dairy bulls.
Dairy Husb. 1064 (NE-1)
- Pa. Sexual Behavior and Semen Production of Dairy Bulls. To learn influence of frequency of semen collection on sexual behavior & semen production, (2) range of variability in sexual activity of bulls & develop tests for predicting sexual activity of individual bulls, (3) stimulus conditions favoring maximum sexual activity, and (4) influence of drugs & hormones on sexual behavior.
Dairy Sci. P. H. 1221
- Pa. The Artificial Insemination of Dairy Cattle. A. Improvement of Diluters for the Preservation of Bovine Spermatozoa. To determine whether certain chemical substances can be used in semen diluting fluids to improve the livability and fertility of bovine spermatozoa.
Dairy Husb. 1107-A
- Pa. Metabolism of Bovine Semen. To (1) improve methods used in measuring metabolic processes of semen, with emphasis on use of radioactive isotopes, (2) determine extent of use of exogenous sources of energy of bovine spermatozoa, (3) study pathways of carbohydrate metabolism functional in bovine spermatozoa, (4) study effect of variations in nutrition & management of bull on metabolic activity of spermatozoa produced, and (5) study metabolism of seminal plasma & determine its relationship to metabolism of spermatozoa.
Dairy Husb. 1107-D
- R.I. A Study of Sterility in Dairy Cattle with Particular Reference to Certain Infections of the Reproductive Tract. To learn some causes which delay breeding or sterility in dairy animals by (1) learning the epizootology & etiology of diseases causing sterility, (2) preventive & control procedures which will be investigated if an organism producing a definite infection is isolated, and (3) determine influence of treatment on incidence of these diseases of the reproductive tracts.
An. Path. An. Husb. 30 (NE-1)

- S. C. Artificial Insemination of Dairy Cattle. To determine (1) processing procedures most suitable for providing semen capable of producing conception for extended intervals of time after conception, (2) transportation of semen, (3) feeding, management, and environment upon value of semen, and (4) most efficient type of organization, facilities and size of artificial insemination units best suited to South Carolina conditions.
Dairy Husb. 28 (NE-1)
- S. D. A Study of the Recovery and Transplantation of the Bovine Ova. To (1) develop techniques for the invivo isolation of the fertilized and unfertilized bovine ova; and (2) after development of the isolation technique, to develop transplantation studies.
Dairy Husb. 189
- Tenn. The Effects of Radiation on Reproductive Physiology in Farm Animals. To evaluate effects of acute & chronic irradiation on reproductive physiology & growth in farm animals on (1) semen characteristics, (2) potential fertility in male, (3) estrual cycle phenomena in female, (4) potential fertility in female, (5) endocrine system, and (6) growth of young animals.
An. Husb. Vet. 65, Coop. ARS
- Tenn. Maintaining or Improving Fertility of Dairy Bulls or Their Semen Used for Artificial Insemination. To investigate methods of feeding and managing dairy bulls and of processing or handling their semen so as to promote the maximum fertility and efficiency in artificial insemination of dairy cows.
Dairy Husb. 11
- Texas A Study of the Nutritional Requirements for Reproduction and Lactation. To learn (1) nutritional requirements for reproduction & lactation using rats as experimental animals, (2) concentrate & identify unidentified factor(s) needed for reproduction &/or (3) learn kinds & proportion of ingredients to use in diets composed entirely of natural feed stuffs in order for females to wean maximum number of young.
Biochem. Nutr. 974
- Texas A Study of the Maturation Process in the Ova of Mammals. To (1) determine normal maturation process of egg nucleus in cow, ewe, sow, mare & mule, (2) ascertain maturation response of egg nucleus during induced ovulation in both the follicular & luteal phase of the cycle, and (3) obtain data for cause of infertility of mammalian eggs.
An. Husb. 854
- Vt. Causes and Prevention of Reproductive Failures in Dairy Cows. To (1) determine extent and nature of reproductive failures in native dairy herds, including histopathological & microbiological examinations of aborted feti, and (2) develop methods of early diagnosis & prevention.
An. Path. 1 (NE-1)

- W. Va. Comparison of Young Bulls with Proven Bulls in Artificial Breeding. To (1) determine if young bulls may be selected for butter-fat production as effectively as proven bulls, (2) apply & evaluate indexing procedure which has been developed for indexing unproven bulls &/or females that have not lactated, and (3) determine if a more rapid improvement of dairy cattle may be obtained by sampling more young bulls in artificial breeding than will be needed for replacement, than may be attained if only proved bulls needed for replacement are brought in.
Dairy Husb. 67
- W. Va. Causes of Sterility in Cattle. To study possibility of viruses as a cause of sterility.
An. Path., Dairy Husb. 30 (NE-1)
- W. Va. Breeding Efficiency of Dairy Cows. To study (1) failure of cows to conceive with single service, (2) value of hormones and vitamin C as aid to conception, (3) value of physical therapy as aid to conception and (4) hereditary involvement of specific breeding problems.
An. Husb., Dairy Husb. 42
- Wis. Endocrine Relations in Farm Animals. To determine definite reproductive states in animals (particularly cattle), the endocrine mechanisms responsible, and methods of modifying them.
Zool., Dairy Husb., Genetics 532
- Wis. Forage Composition and Crop Management as Related to Reproductive Disorders in Cattle on Marsh Areas in Central Wisconsin. Survey in detail plant populations in pastures where abortions have occurred & in those where occurrence is seldom; correlate plant species present with same or other species with known adverse effect. Feed management of unfavorable pastures to see if time of pasturing, stage of growth, season, or past treatment may be involved. Experiment with various treatments or seedings to test factors previously shown as sources of difficulty.
Agron. Vet. Sci. 957
- Wyo. Blood Typing Beef and Dairy Cattle to Study Possible Association of Blood Groups with Economic Characteristics. To (1) study possibility of genetic association between blood groups & economic characters.
An. Prod. Vet. Sci. 556

Feeding and Management

A. Roughage

- Ala. Productive Performance of Dairy Cows on Some Common Forages.
To (1) determine dry matter intake & digestibility of organic matter of several common forages by mature dairy cattle, (2) identify factor(s) that affect consumption and digestibility of forage dry matter, and (3) study lactation stimulating qualities of common forages.
An. Husb., Nutr., Agron., Soil 537
- Ala. Improvement of Production and Utilization of Feed and Forage for Beef and Dairy Cattle in Alabama. To learn, at various locations in the state, the factors affecting the efficiency of utilization of mixtures of legumes & grasses by beef & dairy cattle, (a) to learn relationship between the production of dry matter of various legumes & grasses under various management practices & the production of animal products, (b) to investigate the efficiency & economy of utilizing certain high yielding crops as silage, silage, or hay to supplement pasture or grazing crops, (c) learn costs & returns of irrigation on permanent pastures & on forage crops harvested for silage or hay, (d) learn the feasibility of reducing labor requirements by mechanization of harvesting, storing, & feeding silage & hay, & (e) to investigate supplementary feeding & the factors of age & finish in relation to the economics of forage crop utilization.
Agron., Engr., An. Husb., Nutr., Dairy Husb. Ag. Ec. 555
- Ala. Galactopoietic Substances in Forage Crops and Other Feeds.
To (1) characterize galactopoietic qualities of certain compounds found in relatively high concentration in some dairy feeds, and (2) study effect of substances such as diethyl-stilbestrol & somatotropin on established lactation in low producing & short lactation cows.
Dairy Husb. 556
- Alaska Production, Processing and Preservation of Alaskan Roughage.
To (1) determine feeding value of barn dried hay and silage fed independently & in combination, (2) compare peas & oats silage & barn dried hay with brome grass silage & barn dried hay, (3) compare feeding value of peas & oats & brome grass silage made in conventional way with the same crops preserved as baled silage, & (4) develop inexpensive methods of drying hay by forced air, by stacking partially cured hay on a false tunnel.
Agron., Dairying, Engr., AL-1-3--11(P)
- Ariz. The Evaluation and Utilization of Low Quality Roughages as Feeds for Livestock in Arizona. To evaluate by chemical analyses, digestibility trials, & palatability studies, roughages & by-product feeds present in Arizona & which possess nutrient deficiencies & palatability limitations. Learn effective & economical methods for efficient utilization of these low quality roughages.
An. Ind., Dairy Ind., Agron. 388

- Ariz. Pellets Made from Dehydrated Immature Alfalfa as a Supplement Food for Milk Production. To determine (1) feeding value of pellets made from immature alfalfa as a supplement to silage when the two are the only roughages in the ration, & (2) its value as a roughage and concentrate replacement.
Dairy Husb. 377
- Ark. Establishment and Management of Pastures in Arkansas. To (1) develop methods for establishment of pasture crops, (2) evaluate methods of pasture management, and (3) develop practices for using pastures in grassland farming.
Agron. 341
- Ark. Nutritive Principles in Green Feed. To demonstrate, isolate, and identify the unknown or little understood nutritive principles of green feed, and to determine the part each plays in the growth, health, and reproduction of the various species of laboratory and farm animals.
An. Ind. 167
- Ark. The Nutritive Value of Forage Species. To determine (1) composition of pure forage species as revealed by chemical analyses, (2) nutritive value of pure forage species & of mixed herbage in short feeding experiments with guinea pigs or rabbits, with growth rate as index of nutritive value, (3) biological value of proteins of forage & of those of a mixed herbage in short nitrogen balance tests based on N kept in body by animals during short periods, (4) N & amino acid content of forage proteins, and (5) extent to which forage composition & nutritive value is affected by climatic factors & cultural practices.
Agron. Ag. Chem. 344
- Ark. Investigation of Improved Rations and Roughage Utilization by Dairy Cattle. Learn nutritive value of different kinds & qualities of Arkansas forage for dairy animals. Realize greater utilization of forages in rations by improving quality of forage by better methods of forage preservation, & using rations containing forages in combination with various supplementary materials.
An. Ind., Vet. Sci. 402
- Calif. Economic Analysis of Forage Harvesting and Utilization with Emphasis on Green Chopping Techniques. From 1-4 analyze the physical & economic aspects as (1) relationships among alternative or combinations of methods & machines, (2) effects of alternative harvesting methods or combinations of methods on handling & utilizing forage & on livestock management systems, (3) interrelationships among alternative systems of harvesting & utilizing crops & size & type of operation, (4) input-output relationships for systems of harvesting & utilizing crop & effects on farm earnings, and (5) analyze effects of harvesting systems & use of crops on tenure, capital, managerial functions.
Ag. Ec. Agron. 1672 (11--36)

- Calif. Fiber and Fibrous Feeds in Nutrition. To (1) study utilization of isolated fiber (cellulose, hemicellulose, lignin and combinations) and fibrous feeds, by rats, pigs, cattle and sheep thru use of ad libitum and paired feedings, N balance and digestibility, (2) make chemical studies on methods of analysis and isolation of fibers, and (3) apply findings to the utilization of forage.
An. Husb., Engr., Agron. 1569
- Del. Profitability of Alternative Forage Programs on Delaware Dairy Farms. To compare physical and economic input-output relationships resulting from different combinations of forage crops on dairy farms.
Ag. ¹c. 436-536 (NE-18)
- Del. Lima Bean Silage. To determine feeding value of lima bean silage for dairy cattle.
A & P Ind. 33
- Ga. The Nutritional Requirements of Dairy Calves. 1. The Use of Pasture Forage as a Component of the Ration of Dairy Calves. To (1) determine extent to which pasture forage may be used as a component of rations of young dairy calves, (2) investigate any special problems in management that may accompany the use of pasture forage, (3) determine kind and quantity of concentrates required to insure proper growth and development of calves on pasture, and (4) determine quantity of pasture needed to insure success from this feeding program.
Dairy 53
- Ga. Raising Dairy Heifers on Improved Pastures. To determine the suitability & value of various types of pastures & feeds for growing out dairy heifers.
Chem. An. Ind. 41
- Ga. The Relative Value of Various Summer and Winter Pastures for Lactating Dairy Cows. To learn (1) relative value of various varieties of oats, Abruzzi rye, & other winter crops, (2) relative value of Starr millet or other temporary summer forage crops & Coastal Bermuda grass, grown under varying fertility levels.
Agron. Dairy Ind. 109 Coop. DHRB
- Ga. Techniques for Forage Evaluation with Dairy Cows. To (1) determine measure of quality which are indicators of a forage having ability to influence milk production, (2) investigate relative usefulness of available forage evaluation techniques & make necessary additions or changes to provide suitable techniques, and (3) study such interactions as quantity of forage, animal grazing behavior, forage chemical composition, & nutrient inter-relationships with animal performance.
Dairy Husb., Chem. 55 (S-12)

- Ga. Locally Grown Forages in the Dairy Ration. To study (1) characteristics of forages which permit or inhibit stimulation of milk production, (2) effects of pasture management in maintaining & using forage possessing desired characteristics, & (3) need for type needed & effect of supplemental feeds with various forage types & pasture conditions.
Dairy Husb. 23
- Ga. Effect of Various Methods of Handling, Preserving and Feeding Forages as Silage upon Their Nutritional Value as Dairy Cattle Feed. To (1) evaluate ensiling practices currently used (2) determine effect of adding preservative on nutritional value & dry matter conservation, (3) develop more adequate analytical procedures to evaluate silages, (4) determine effect of various additives on consumption rates of relatively unpalatable silages, & (5) compare feeding value of hay & silage made from same forage when fed as total or as a supplementary roughage to milking cows.
Dairy 66
- Hawaii The Conversion of Forages and Byproducts Grown or Produced in Hawaii into Palatable and Nutritious Silage and the Determination of the Nutritive Value, by Actual Feeding Trials, of Ensilage Produced from the Most Promising Materials and Procedure Developed. (1) To develop, by feeding trials, the best and most economical rations for dairy animals, using the most promising and economical silages of strip cane, legume and nonlegume crops developed under subproject 1 to as great an extent as possible in replacing imported concentrates.
An. Husb. 275
- Ill. Silage Crops for Dairy Cattle. To compare southern varieties of corn with those in this section and prolific with nonprolific types of corn for silage, seeking a type which will combine large yields of dry matter per acre with good keeping qualities and feeding value as silage.
Dairy Sci., Agron 524
- Ill. Utilization of Roughages by Dairy Cattle. To provide fundamental information on optimum nutritive conditions for use of forages by dairy cattle and on value of various roughages in feeding dairy cattle.
Dairy Sci. 35-314
- Ind. The Effect of Stage of Maturity on Utilization of a Pasture Mixture by Dairy Cattle. To determine effects of stage of maturity of pasture mixture on use by producing dairy cows.
Dairy Husb., Agron. 779
- Ind. Factors Influencing the Fermentation and Utilization of Legume-Grass Silage. To determine (1) physical & physiological factors influencing grass silage fermentation, and (2) degree of utilization of selected silages in vitro and in vivo.
Dairy Husb. 771

- Ind. A Comparison of Grass Silage, Made from Various Grass Species, with Hay as a Winter Roughage for Dairy Cattle. To (1) determine effect of legume and grass combinations on palatability when stored as grass silage or hay, (2) compare nutritive and economic value of legume and grass combinations stored as silage or hay, and (3) determine preservation of certain chemical constituents of grass and legume combinations stored as silage or as hay.
Dairy Husb., Agron. 559
- Ind. The Improvement of Procedures for the Evaluation of Forages. To (1) determine quantitative relationships between clipping procedures & results obtained from grazing trial for measuring output per acre, (2) determine if there are interactions between harvesting methods, both animal & non-animal, & species, strains, & associations of two or more species, (3) explore use of artificial rumen to determine digestibility of nutritionally important components of forages, & (4) study magnitude & nature of experimental errors in various methods of measurement & with units of measure usually recorded in evaluation processes.
Dairy Husb., Biochem., Agron. 744 (NC-11)
- Iowa Effect of Quantity and Quality of Feeds and Feed Accessories on Yield, Composition and Quality of Milk and the Well-Being of Dairy Animals. To (1) determine extent to which one roughage can replace another in dairy cattle ration, (2) compare various methods of preserving roughages as hay or silage and feeding values, (3) compare various feeding intervals & economy of roughage utilization under different housing systems, (4) determine relative feeding values of various concentrates alone & in combinations measured in terms of milk yield, health and reproductive behavior, & (5) determine effect of various feeds alone & in combination on quality of milk & on processing and quality of milk products.
Dairy Husb., Chem. 1124
- Kans. Fundamental Nutrition Studies of Sorghum Roughages and Grains.
II. A Study of the Digestibility of Sorghum Silage. To determine the coefficients of digestibility of sorghum silage when fed alone and in conjunction with a high-protein concentrate.
An. Husb., Chem. 222-2
- Kans. Pasture Crop Breeding, Testing, and Evaluating. To breed new varieties of pasture crops and evaluate them with respect to yield and quality of forage, seed production, competitive capacity in mixtures, and adaptability to climatic and soil conditions.
Agron. 310
- Ky. A Comparison of the Nutritive Values of Orchard Grass, Smooth Bromegrass and Varieties of Tall Fescue. To determine the digestibility, palatability & nutritive value of new varieties of tall fescue in comparison with Ky. 31 fescue, and with orchard grass and smooth bromegrass.
Agron. Dairy 66

- Ky. The Effect of Various Kinds of Pasture and of Management Practices on Maintaining High Milk Production. To evaluate various pasture forages and pasture management practices for the maintenance of high milk production.
An. Husb., Dairy, Agron. 16
- Ky. Utilization of Low-Quality Roughages by Dairy Heifers. To study the value of low quality roughages for dairy heifers and of factors affecting their utilization.
Dairy 78
- La. The Effect of Certain Management Practices and Controlled Stress on the Physiological Response of Dairy Animals. To determine (1) value of succulent feeds, such as silage and irrigated pasture, in maintaining high milk production during summer, and (2) effect of various management practices on physiological response of dairy animals when subjected to controlled temperatures ranging from 60°F to 105°F at controlled humidity.
Dairy 540
- La. Improved Methods of Harvesting, Handling, Curing and Storage of Hay and Silage. To (1) continue studies with duct systems and fan layout for barn hay drying adaptable to the present La. barn, (2) continue developmental work on an economical burner and on safety controls for burning natural gas and butane, (3) make comparative studies handling costs for long hay vs. chopped hay and merits of equipment for handling each when using a barn dryer for finish curing, and (4) continue development work and cost studies on use of forage wagons for drying chopped hay.
Ag. Engr. 571
- Maine Roughage Preservation Under Maine Conditions. To (1) study relative preservation of dry matter, protein and carotene in grass silage, barn-cured hay, and field-cured hay on an acre basis, and (2) determine relative milk production obtained from an acre of grassland when forage is preserved as grass silage, barn-cured hay and field cured hay.
Agron., Ag. Chem., An. Ind. 60
- Maine Economics of Forage Production, Harvesting, Storage and Utilization on Central Maine Dairy Farms. To (1) ascertain & describe major patterns of production, harvesting, storage & use of forages on Central Maine dairy farms, (2) determine costs of producing, harvesting, storing & using forages on farms with these patterns, (3) determine milk production & associated income potential from feeding forage available under major patterns, & (4) compute & compare net incomes above feed costs resulting from feeding forage available under the patterns.
Ag. Ec. 45 (NE-18) Coop. ARS

Md.

Seedling Establishment and Management of Legumes and Grasses.

To (1) determine effect of various clipping treatments on seedling establishment & later development of forage species, grown with & without a companion crop, (2) determine effect of fertilizer levels, fertilizer placements, & seed placements of seedling establishment, & later development of forage species, and (3) relate varying effects of management practices & climatic influences, in order to determine best combinations of procedure for successful establishment of forage species.

Agron. B-56-m (NE-21)

Miss.

Mechanized Harvesting and Feeding of Silage.

To (1) evaluate available machines as to use in mechanized feeding program, (2) store silage harvested by (a) convential equipment, row crop harvester & other regular equipment as required, (b) bale & stored in round form, & (c) baled & stored in rectangular bales in trench silo, or upright & stacks, determining labor problems efficiency of storage & storage problems, (3) modify present equipment to handle heavy silage in bale form & modify loading equipment & unloading equipment for baled silage, (4) develop, modify & adapt transportation units so that mechanized and/or self feeding is practical, (5) determine efficiency of feed system in converting feed into milk, especially automatic feeders, & (6) study feeding problem when feed is in bale form to determine necessary equipment for handling.

Dairy, An. Husb. Ag. Engr. FB-5

Mich.

The Effect of Soil Fertility on the Composition and Nutritive Value of Crops and on the Health, Milk Production, Reproduction, and Nutritive Value of the Milk of Animals Eating the Crops. To determine (1) if a high state of soil fertility results in an improved nutritive value as well as increased yield (2) comparative effect of crops grown on depleted and improved soil on health, reproduction, and milk production of offsprings for several generations, (3) effect of additions of lime, complete fertilizer and "minor" elements to a depleted soil on yield, composition, and vitamin content, and (4) effect of additions of lime, fertilizer and "minor" elements on chemical characteristics of a badly depeleted soil.

Soil, Dairy, Chem., Home Eco., Farm Crops 76

Mich.

Unidentified Young Grass Factors Required for Efficient Milk Production and Their Preservation in Cured Roughages. To study (1) properties and attempt to concentrate grain factor present in young grass and grain, (2) a second factor present in certain hays that increases milk production when sufficient amount of grain factor is present, (3) use of small animals to speed up these investigations, and (4) possibilities of conserving other unidentified factors present in young pasture grass for winter use.

Dairy Husbandry, Chem. 45

- Mich. Pasture & Grass Establishment, Management & Utilization.
To secure information that will lead to improvement of pastures in Michigan, specifically, to secure information (1) about pasture crops, their composition, culture & management, (2) on place of pastures in soil conservation program; how they affect productivity of soil as well as preventing erosion, and (3) on nutritive value of different pastures for dairy cattle and other livestock.
Fm. Corp. Soils, Ag. Eng. 49 Coop. USDA
- Minn. Investigations of the Carbohydrates of Forage Crops with Emphasis on the Hemicelluloses. To investigate chemical nature & structure of carbohydrates of forage with emphasis as above. To accomplish by (1) isolating hemicelluloses from brome grass & from alfalfa, (2) degrading hemicelluloses or derivatives prepared therefrom into components as pentoses & uronic acids & their derivatives; separate & identify latter by chemical & physical properties; determine quantitatively relative proportions of various components of hemicellulose molecules, (3) deduction from objective 2 manner in which components are linked together, thus providing basis for studies of susceptibility of various linkages to cleavage by enzymes of rumen microorganisms.
Biochem., Dairy Ind., An. Ind. 1518 (NC-25)
- Miss. Milk Production in Relation to Year-Around Grazing Systems.
To (1) determine comparative value of various permanent & temporary grazing crops for milk production measured by grazing performance of dairy cattle, (2) determine cost & economic returns from various crops, (3) evaluate effect of sod seeding winter grazing crops in permanent summer sods on total yearly forage production, distribution of forage production, & on stand of summer crops, and (4) evaluate effect of sod seeding & conventional seed bed preparation on forage production of both a winter & summer temporary grazing crop.
Dairy Husb. FG-1
- Miss. Studies on Preservation & Evaluation of Roughages for Growth & Milk Production in Dairy Cattle. To develop a system of forage harvesting, preserving, & feeding which will most efficiently and economically supplement good pastures in maintaining satisfactory & economical rates of growth & levels of milk production throughout the year with a minimum of concentrate feeding.
Dairy Husb. FG-4
- Miss. A Study of the Comparative Feeding Value of Different Silages for Milking Dairy Cows. To measure (1) yields per acre of silage crops & costs of production, & (2) value of these silage crops as source of roughage for milking dairy cattle.
Dairy Husb. PG-1
- Miss. A Study of the Effect of Self-Feeding in a Trench Silo on the Performance of Milking Dairy Cows. To learn (1) effect of self-feeding from trench silo on feed consumption & milk production, (2) effect of different ways of feeding on amount of spoilage & consumption of silage, (3) number of cows that may be self-fed from silo of given width, (4) effect of self-feeding silage on milk flavor, & (5) efficiency in different types of covers in preventing silage spoiling.
Dairy Industry BG-1

Miss.

A Comparison of Soiling Versus Grazing Summer Pasture Crops. To learn (1) use of tall growing summer forage crops harvested by "close folding," rotational grazing, and by soiling, (2) effects of soiling versus grazing on feed consumption & milk production, & (3) interaction of feeding systems with high atmospheric temperatures as measured by feed consumption & milk production.

Forage, Dairy Sci. FG-12

Miss.

A Study of the Efficiency of Measuring Pasture Forage Production by Clipping Caged Areas, by Indicator Methods & by Grazing Results with Dairy Cattle. To (1) test use of clipping & indicator methods of measuring forage production against grazing performance of dairy Cows to develop more reliable techniques to apply small plot clipping results to grazing animals, (2) find combination of methods to measure pasture forage production which will allow more accurate measurements of effect of climate, fertilization & management on feed nutrient production of pastures, (3) determine how less expensive clipping & indicator methods can replace expensive measuring of grazing performance without much reduction of accuracy, and (4) determine relative results of different methods of measuring forage production when applied to crops with different growing habits.

Dairy Husb. FG-5

Mo.

Nutritive Value of Foods. a. Nutrients in Grains, in Forage Crops, & in Rations of Ruminants Before & After Fermentation in an Artificial Rumen by Rumen Microorganisms. To (1) compare nutritional value of newer forages, (2) obtain further data on effect of fertilizer treatments on nutritional properties of plant.

Ag. Chem., Field Crops 212-a

Mont.

The Usage of Pasture Grasses by Dairy Cattle. To determine which type of pasture management will result in (1) greater consumption of total digestible nutrients, (2) greater yield of total digestible nutrients per acre, (3) greater milk & fat production, (4) better flavored milk, & (5) greater milk production economy.

M. S., 908, Dairy Ind. 1,18

Nebr.

Irrigated Pastures for Dairy Cattle. To (1) develop irrigated pasture plan for dairy cattle, which will be suitable for Eastern Nebraska or similar areas, covering determination of plant species most suitable & management of pasture with respect to rate & time of fertilization, (2) determine irrigation requirements for high producing pastures & evaluate factors which may influence amount of water required during each irrigation period, (3) determine if addition of abundant pasturage to a good feeding program would affect breeding efficiency, health, milk production, & length of productive life of dairy cattle, (4) observe effect of use of abundant pasturage upon cost of milk production, (5) determine to what extent usual seasonal variations in Vitamin A value of milk can be affected by use of irrigated pastures, (6) determine what return can be expected in this area, from land used for irrigated pasture, & (7) determine relationship between oxidized flavor in milk & amount of pasture used in the ration.

Dairy Husb. Ag. Eng. 378

- Nev. High Roughage Feed for Dairy Stock. To learn effect of feed-high roughage diets to milking cows, dry cows, heifers, & calves.
Ag. Eng., An. Husb. Ext. 20
- Nev. Introduction, Improvement & Utilization of Grasses & Legumes for Southern Nevada. Discover & show merits of better grasses & legumes; lengthen grazing season by means of suitable dairy pastures for cool & hot periods; approach economic optimum use of forages for milk production, & for growth of non-milking dairy cattle; improve some of best forage varieties found in testing.
Agron. Dairy Ind. 14
- Nev. A Study of the Nutrient Content of Alfalfa Hay as Influenced by Methods of Harvesting & Storage. To study (1) effect on the carotene, protein, chlorophyll & vitamin E content of alfalfa hay as influenced by these methods of harvesting & storage -- stacking, baling, chopping, & silage, (2) effect of degree of maturity on alfalfa hay, (3) effect of moisture on preserving nutrient content of alfalfa, & (4) development of rapid field test to measure moisture of cut alfalfa.
Res. Chem. 90
- N.H. The Effect of the Maximum Use of Roughage upon the Reproductive Efficiency of Dairy Cattle. To determine effect on the reproductive performance of dairy cattle of feeding roughage grown on a restricted area under intensive fertilization as the principal source of nutrients.
Dairy Husb. 14-A (NE-1)
- N.H. The Maximum Use of Roughage in Feeding Dairy Cattle. To determine (1) if grass silage can be used successfully in feeding young dairy calves, (2) value, if any, of supplementing grass silage with corn silage and/or hay in feeding calves, yearling heifers & cows, (3) what rates of growth & milk production can be supported in heifers & cows fed high quality roughage as only source of nutrients, & (4) how much the amount of grain normally fed dairy cattle can be reduced without decreasing net return when liberal amounts of good roughage are fed.
Dairy Husb. 14
- N.H. The Nutritive Evaluation of Forage for Dairy Cattle. (1) Improve & standardize procedures for nutritive evaluation of forages for dairy cattle. (2) Compare values for energy as net, digestible, metabolizable & compare digestible dry matter & total digestible nutrients determined on same forage. (3) Learn effect of stage of maturity & level of N fertilization on nutritive value of certain forages. (4) Learn effect of variables on nutritive value of acre yield. (5) Learn effect of variables on excretion of certain B complex vitamins.
Dairy Sci., An. Ind. Agron. 51 (NE-24)
- N.H. The Hemicellulose of Forage Crops. To determine what differences occur in the hemicelluloses of forage crops (1) in different parts of the plant and (2) as the plant matures.
Ag. & Bio. Chem. 45 Coop. U.S. Reg. Past. Res. Lab.

- N.J. Investigations for the Production of Forage in a Grassland Program for Dairy Cattle. To obtain information on (1) pasture & hayland management in a grassland farming program, (2) adaptability of new species of pasture & hay forage crops to grassland farming in the northeast, (3) fertilization of grassland crops, (4) effect of fertilizer treatments on plant populations, total forage yields at different stages of maturity & longevity in straight & mixed stands, (5) efficient methods of establishing improved varieties of pasture & hayland forage crops on pasture & hayland, and (6) more efficient methods of harvesting forage crops with emphasis on conservation of plant nutrients.
Dairy Ind. 134
- N.J. Milk Potentials of Roughage in the Feeding of Dairy Cattle. To study (1) production levels on three groups of animals on pasture, (2) study economics of each system of feeding, (3) evaluate different seeding mixtures in terms of milk, & (4) evaluate yield and persistence of various combinations through clipping & grazing management.
Dairy Ind. 135-IV
- N.J. Economics of Growing, Harvesting & Storing Forage. To obtain new & up-to-date facts on the economics of modern methods of production, harvesting & storing roughages.
Ag. Eco. 39 (NE-18)
- N.J. Relationship of Time of Cutting to Digestibility of Hay from Alfalfa & Birdsfoot Trefoil. To determine the digestibility of (1) alfalfa hay cut during the 1/10, 1/2 and full bloom stages, and (2) Birdsfoot Trefoil hay during the 1/10, 1/2 and full bloom stages.
An. Husb. 90, Farm Crops 256 (NE-21)
- N. Mex. The Effect of Fertilizer Treatments & Cutting Schedule on the Chemical Composition of Irrigated Pasture Crops. To determine (1) effect of N and P fertilizers & cutting schedules on chemical composition of pasture crops, (2) effect of heavy N on nitrate accumulations in forage, (3) molybdenum content of irrigated pasture, & (4) correlation between available P and Ca in soil & uptake of these elements by plants.
Agron. 8
- NYC Factors Influencing the Preservation of Roughages. II. A Study of the Sources & Control of Nutritional Losses Occurring during the Harvesting & Storage of Hay & Silage. To (1) determine relative magnitude of nutritional losses occurring as a result of respiration, leaching, leaf shattering, & other causes when various forage crops are made into hay & silage, (2) find ways to minimize field & storage losses when forage crops are made into hay & silage, & (3) determine better methods of producing high quality roughage from hay crops.
An. Husb. Agron. 98-II

- NYC. The Development & Use of Indirect Methods for the Measurement of Digestibility & Rate of Consumption of Feedstuffs, Particularly Pasture Forages, by Ruminants. To test adequacy of indicator methods (chromogen & Cr_2O_3) previously developed with steers for measurement of digestibility & intake of grazing cows, and/or modify these to effect reliable measures with cows.
An. Husb. 58
- N.C. The Contribution of Tall Fescue & Ladino Clover to Pastures Grazed by Milking Dairy Cows. To (1) study effect of ladino clover alone, tall fescue alone, and the two together upon milk production of dairy cows when these are used as sole source of roughage, & (2) make general observations as to role of a grass in pasture sods in southeastern North Carolina.
Ani. Ind., Agron. 22 C p. BDI
- N.C. Effect of Fertilization & Management on the Composition & Nutritive Value of Plants Commonly used for Livestock Feeds. To (1) study effect of different fertilizers on composition of whole plants, soybeans, lespedeza, bull grass, rye grass, & related forage plants, (2) make similar composition studies on various parts of soybean plants & other legumes, (3) study interrelationships of fertilization & maturity on composition of plants, (4) determine at intervals thruout grazing season, changes in chemical composition of grazed forages differently fertilized, & (5) study nutritive characteristics of plants by feeding & metabolism studies with laboratory animals.
Ani. Ind. 24.
- N.C. Effect of Fertilization & Management on the composition & Nutritive Value of Plants Commonly Used for Livestock Feeds. To (1) study effect of different fertilizers on composition of whole plants, soybeans, lespedeza, bull grass, rye grass, & related forage plants, (2) make similar composition studies on various parts of soybean plants & other legumes, (3) study interrelationships of fertilization & maturity on composition of plants, (4) determine at intervals thruout grazing season, changes in chemical composition of grazed forages differently fertilized, and (5) study nutritive characteristics of plants by feeding & metabolism studies with laboratory animals.
Ani. Ind. 24
- N.D. Sudan Grass Improvement for North Dakota. To produce, select and test lines of Sudan grass which are agronomically adapted to North Dakota conditions & which are lower in hydrocyanic acid content than the commonly grown varieties.
Agron., Ag. Chem., An. Ind. 12
- Ohio Crops & Practices for a Dairy Enterprise. To (1) Compare brome-grass with timothy on pilot farm basis from standpoint of overall productivity & desirability for dairy farms in northeastern Ohio, and (2) evaluate operation risks assumed by farmer in use of either of the two grasses.
Agron. Dairy Ind. 1.2-3

- Ohio A Comparison of Bromegrass & Orchardgrass for Rotation Pastures for Lactating Dairy Cows. To (1) determine if southern-type bromegrass or orchardgrass is best suited for use in rotation pastures for lactating dairy cows, and (2) gain information on supplementary feed needs of lactating dairy cows on pasture.
Agron., Dairy, Vet. Sci., Ent. 2-1
- Ohio Feeding Trials with Meadow Crop Silage. To obtain a high quality meadow crop silage & to compare such silage with corn silage in feeding trials with milking cows.
Dairy Ind. 35-10
- Ohio Chemical Analysis of Crops & Silage. To (1) determine chemical composition of crops as ensiled & of silages made in main project or in individual subprojects, (2) relate changes in composition to various procedures or treatments given individual lots of silage, & (3) relate chemical composition to human scoring & palatability to animals.
Dairy Ind. 35-7
- Okla. Improving the Utilization of Low Quality Roughages. To determine (1) value of alfalfa ash in utilization of low-quality roughages, (2) mineral deficiencies of roughages, which are improved by addition of alfalfa ash, (3) effective combinations of inorganic elements for more efficient use of low-quality roughages, and (4) practical supplements to supply nutrient deficiencies of low-quality roughages.
Ani. Husb. Ag. Chem. 874
- Oreg. The Nutritive Evaluation of Pasture Grasses by Use of Plant Chromogens. To determine the adaptability of the chromogen method for showing significant differences in digestibility between genotypes of tall fescue.
Ag. Chem. Farm Crops 80-4 (W-23)
- Pa. The Value of Grass Silage in the Diet of the Young Dairy Calf. To (1) determine feasibility of feeding high quality grass silage as only roughage to young dairy calf, (2) study effect of supplementing hay with grass silage in ration of young calves, & (3) investigate feeding maximum levels of roughage to calves while restricting concentrate intake.
Dairy Husb. 1155-C
- Pa. Evaluation of Grasses & Legumes for Hay, Grass Silage, & Pasture for Dairy Cows. To (1) determine relative persistence and productivity of a number of grass-legume associations for silage followed by summer grazing, & (2) evaluate several management systems on an orchard grass ladino clover sward with respect to maintenance of legume & productivity of these forage species.
Agron. Dairy Husb. Chem. 1024-A Coop. U.S. Reg. Pasture Res. Lab.
BPISAE

- Pa. The Nutritive Value of Hay as Affected by the Method of Curing.
To determine (1) if it is feasible to bale hay at moisture higher than 20% which is safe for good keeping in storage, by adding a preservative agent at time of baling or storage, (2) best method to apply sodium bisulfite at baling to insure uniform distribution thru the bale, & (3) by nutritive evaluations if addition of sodium bisulfite results in enough saving of feed nutrients present in forage to justify additional cost & application.
Ani. Nutr. Agron. Engr. 1016-E
- Pa. The Nutritive Value of Grass Silage as Affected by Species & Stage of Maturity. To establish quantitatively the relationship of nutritive value of silage to definite species of forages & to stage of maturity of forages when harvested.
Agron. Ani. Nutr. 1016-A (NE-21)
- Pa. The Type of Storage of Grass Silage as Affecting Nutritive Value (and Losses). To compare effectiveness of upright silo, silo stack & trench silo in retaining nutrients of grass silage, with & without preservatives.
Ani. Husb. Ani. Nutr. 1016-B
- Pa. Fermentation Studies in Grass Silage. To observe changes in grass silage made with various additives in relation to numbers & types of bacteria present, substrate on which they are working, & products of fermentation, various organic acids, mainly propionic, lactic, acetic & butyric acid.
Ani. Nutr. Bact. 1016-D
- Pa. The Losses of Nutritive Value of Grass Silage in Tower Silos as Affected by Method of Preservation. To determine losses from silo from seepage & from fermentation & evaluate effectiveness of use of sodium metabisulfite, wilting, & absorbers in reducing losses.
Ani. Nutr., Dairy Husb. 1016-C
- P.R. The Utilization of Grasses, Legumes & Other Forage Crops for Cattle Feeding in Puerto Rico. To determine (1) best grasses, legumes & other forage crops to grow for cattle feeding, (2) best feeding methods, and (3) possibilities of preparing hay & silage under Puerto Rican conditions.
Ani. Husb. 50 (S-12)
- P.R. Fundamental Studies in the Nutrition & Metabolism of the Dairy Cow in Puerto Rico. To (1) determine caloric & energy values of our forages & dairy rations, (2) explain apparent inefficient use of nutrients by lactating cows, & (3) discover nutritive factors that limit our milk production.
Ani. Husb. 55

P.R.

The Economics of Irrigation in Forage Production & Use for Beef & Dairy Cattle. To (1) determine costs & returns for different irrigation systems; (2) determine capital & labor needs for several irrigation methods, (3) evaluate farmer experiences with irrigation, & (4) investigate potentialities of irrigation as a means of increasing productivity of farm resources.

Ag. Eco. 107 (S-27)

P. R.

The Economics of Machinery, Power, & Labor in Forage Production & Use for Beef & Dairy Cattle. To (1) determine best & most economical types of equipment for production & harvesting forage crops, (2) evaluate adaptability of different equipment, machinery & labor for different systems of livestock management, & (3) investigate potentialities of use of machinery as a means of increasing farm income.

Ag. Eco. 213 (S-27)

R.I.

A Study of the Relationships of the Forage Program to Dairy Farm Organization. To (1) determine feeding systems on DHIA farms, (2) study the relationship between forage production & feeding systems on selected DHIA farms, (3) study forage production & feeding system relationships of selected "Green Pastures" participants, (4) study use of crop & pasture land on Rhode Island dairy farms, (5) study forage production as related to the size of the dairy enterprise, (6) determine relationship of forage production to requirements of the dairy herd, (7) ascertain relationship of forage production to requirements of the dairy herd, (8) evaluate effects of various feeding systems on milk production on selected farms, (9) develop case studies of alternative methods of forage production as related to milk production, & (10) study input-output relationships of alternative systems of forage production arising from controlled forage production experiments.

Ani. Husb. Dairy Husb., Agron. 12

R.I.

Zero Pasture as a Summer Maintenance Program for Dairy Cattle. To determine advantages or disadvantages together with economy of maintaining dairy herd under dry lot conditions where forage is chopped and self fed in the lot, including influence on production of 4% fat corrected milk, influence of body weight & general herd health, forage production from pasture when forage is cut, chopped, & dry lot fed instead of grazing, and determining estimated costs involved in labor & machinery use in handling forage.

Agron. Ani. Husb. Dairy Husb. Ag. Eco., Ag. Chem. 32

R.I.

An Economic Analysis of Alternative Pasture Harvesting Methods and Feed Combinations in Milk Production. To (1) study input-output relationship associated with alternative methods of harvesting pasture crops, (2) evaluate effect of alternative harvesting methods on milk production, (3) analyse variations in milk production in similar groups of cows fed different combinations of forage & grain, & (4) obtain physical & economic inputs & outputs for various types, forms, & combinations of forage crops on selected dairy farms.

Dairy Husb. Ani. Husb. Agron. 14 (NE-18)

- E.I. Productivity, Persistence, & Feeding Value of Alfalfa & Ladino Clover as Influenced by Management Differentials. To (1) determine effect of the following factors on forage yield, feeding value & stand persistence of alfalfa & ladino clover when grown alone & with grass: a. stage of growth at time of first harvest in spring: & b. different times of harvesting the last crop in the fall, (2) determine influence of a range of environmental conditions under which these plants are grown on their response to differential cutting treatments, & (3) gain basic information for selecting best combinations of treatments to be used in growing larger plots for actual feeding trials.
Agron. Plant Path. Engr., Chem. 22 (NE-21)
- S.C. Roughages for Dairy Cattle. To study (1) methods of production, preparation & preservation of roughage crops & ascertain their feed value, (2) crops best suited to the state, & (3) value of winter & summer grazing crops and perennial legumes.
Dairy Husb. 6
- Tenn. Winter Grazing for Dairy Cows. To compare milk production on winter grazing with that possible from ordinary winter feeding methods, to observe conditions of cows & pasture when grazed each day of the winter season & to determine the effect of green winter feed on nutritive value & physical condition of milk, its products & ultimately its market value.
Dairy Husb. 14
- Tenn. A Study of the Poisoning of Cattle Pastured on Fescue. To (1) determine incidence of "fescue poisoning" in Tenn., (2) determine clinical, hematological & post-mortem symptoms of "fescue poisoning, (3) attempt to experimentally reproduce disease & attempt to isolate causative factor, and (4) obtain information on method of reducing or eliminating incidence of "fescue poisoning."
Ani. Husb., Vet. Sci. 51
- Vt. Quality in Roughage: The Relative Value of High Moisture & Low Moisture Grass Silage for Growth & Milk Production. To answer: 1. will dairy calves consume more dry matter on low moisture grass silage or on high moisture grass silage? 2. Which silage will produce better growth? 3. How do the 2 silages compare in digestibility? & 4. What are relative values of these silages for milk production?
Dairy Husb. Ani. Husb. Biochem. 110
- Va. The Evaluation of Forages with Dairy Cattle. To learn how state of growth or time of cutting affects quality &/or feeding value of pasture, silage, hay & soiling. Following will be included: intake, palatability, & digestibility effects; balance of nutrient intake, effect on certain blood constituents (carotene, hemoglobin, non-protein N), milk production, body-weight changes, & growth rate, effect of rumination rate, respiration rate, heart rate, & body temperature.
Dairy, BioChem. Agron. 8331

- Va. Yield & Herbage Quality under Two Systems of Grazing. To measure quality & quantity of herbage production under continuous grazing of one pasture vs. grazing program where several mixtures in different fields are grazing in rotation.
Ani. Husb. Nutr., Agron. 8001
- Va. An Economic Analysis of Pasture & Harvested Forage Systems. To (1) assemble & evaluate existing input-output data relating to production of pasture & harvested forage in areas to be studied, (2) collect necessary data to provide input-output relating to major pasture & harvested forage alternatives relevant to farms in area studied, (3) integrate derived input-output data into whole farm plans to learn optimum forage programs on farms of different types & sizes under different price relationships, (4) attempt to estimate relative riskiness of various alternatives developed.
Agr. Engr. 8229 (S-27) Coop. Farm & Land Mgt. (ARS)
- Va. The Conservation of Feed Nutrients & the Feeding Value of Various Silages as Influenced by Preservation Methods. To (1) explore value of various materials as silage preservatives or conditioners, & (2) determine nutritive value of silage preserved with various materials when fed to lactating dairy cows.
Dairy Husb. 8106
- Wash. The Determination of Lignin in Forages. To develop a rapid & economical method of lignin determination which may be used as a measure of the digestibility of forages.
Ag. Chem. 1231
- W. Va. The Influence of Fertility & Management on Several Ladino Clover Grass Mixtures. To (1) determine yield of Ladino clover grown alone & in association with brome grass, Reed canary grass, orchard grass, & Kentucky 31 fescue, (2) determine effect of various fertilizer applications on stand, yield, botanical & chemical composition of various combinations of Ladino clover-grass mixtures, (3) determine effect of management on stand, yield, botanical & chemical composition of mixtures, (4) evaluate compatability of mixtures, & (5) study longevity of stand as influenced by fertility & management.
Agron. & Gen. 59
- Wisc. Yields from Forage Crops under Different Systems of Dairy Cattle Feeding. To compare net returns from forage crops fed to dairy cows under different systems of handling & feeding, particularly during summer months.
Agron. Eco. Engr. Dairy Husb. Soils 90 Coop. USDA
- Wisc. Pasture Management for Dairy Cattle. To study (1) value of fertilization & value of systematic rotation of grazing of permanent bluegrass pastures grazed by dairy cattle & leading to the establishment of good practice in the treatment & management of pasture later, & (2) needs for supplemental pasture or forage during the drought or dormant periods.
Dairy Husb. 345

B. Concentrates, Vitamins, Minerals, Etc.

Calif. Studies of Mineral Metabolism in Animals. 1. Calcium-Phosphate Relations. II. Iodine Metabolism in Cattle. III. Mineral Deficiencies on Range Lands -- Calcium, Manganese, Cobalt, Sulfur, & Other Minerals.

An. Ind. 938

Fla. Mineral Requirements of Cattle. To investigate role of mineral elements in nutrition of cattle, with particular emphasis on inter-relationships of elements in development of nutritional abnormalities observed in Florida.

Nutr., Dairy Husb., An. Husb. 133

Fla. Transfer of Mineral Elements Through the Placenta & Their Distribution in the Fetus. To determine rate and extent of placental transfer of selected mineral elements & to determine distribution of those elements in the fetus.

An. Husb., Nutr. 566

Fla. Investigation of Mineral Nutrition Problems of Livestock Through The Use of Laboratory Animals. To investigate mineral nutrition problems, including mineral interrelationships that occur in farm livestock, using suitable laboratory animals.

An. Husb., Nutr. 346

Hawaii Studies to Determine the Nutritive Value and Metabolism of Products and By-Products of Hawaiian Industry. Seek information relative to value of products & by-products of Hawaiian agriculture & industry for livestock feeding with major emphasis on use of molasses, sugar cane bagasse & pineapple by-products by chemical analysis of feeds to be used; learn digestibility; feeding trials to assess production response accompanied by: studies of nutrient absorption, nutrient & metabolite levels in blood & urine, metabolism & its relation to requirements for specific nutrients.

An. Husb., Agron. 269

Idaho Causes and Prevention of Breeding Failures in Dairy Cattle. To (1) study pre-natal carotene (vitamin A) nutrition on post-natal performance, (2) study relation &/or interrelation of Ca, P, & vitamin D to reproduction & production, and (3), study inheritance & environment as related to breeding performance in dairy cattle.

Vet. Sci., Ag. Chem. 9 (N-2)

Iowa Effect of Quantity & Quality of Feeds & Feed Accessories on Yield, Composition & Quality of Milk & the Well-Being of Dairy Animals. To (1) determine extent to which one roughage can replace another in dairy cattle ration, (2) compare various methods of preserving roughages as hay or silage & feeding values, (3) compare various feeding intervals & economy of roughage utilization under different housing systems, (4) determine relative feeding values of various concentrates alone & in combinations measured in terms of milk yield, health & reproductive behavior, and (5) determine

effect of various feeds alone & in combination on quality of milk & on processing & quality of milk products.

Dairy Husb., Chem. 1124

- Ky. Low Protein Rations with and without Non-Protein Nitrogen Supplements for Dairy Cows. To evaluate the present protein standards of feeding lactating dairy cows, including newer types of nitrogenous feeds such as urea, dicyandiamide & various ammoniated products.
Dairy 79
- Mich. A Study of the Role of Mineral Elements in Nutrition of Dairy Cattle. To (1) investigate role of cobalt & vitamin B₁₂ on appetite of cows, especially after calving when there is a tendency for cows to go off feed due to heavy grain feeding associated with calving, & (2) study interrelationship of cobalt, copper & molybdenum on appetite & health.
Dairy, Chem., An. Path. 24
- Mich. Unidentified Young Grass Factors Required for Efficient Milk Production & Their Preservation in Cured Roughages. To study (1) properties & attempt to concentrate grain factor present in young grass & grain, (2) a second factor present in certain hays that increases milk production when sufficient amount of grain factor is present, (3) use of small animals to speed up these investigations, and (4) possibilities of conserving other unidentified factors present in young pasture grass for winter use.
Dairy Husb., Chem. 45
- Miss. The Effect of Different Levels of Concentrate Feeding on Milk Production. To determine most economical level of grain feeding to dairy cows in Mississippi.
Dairy Husb. FG-8
- Mo. The Effect of Nitrate in Feedstuffs on the Performance of Sheep & Cattle. To (1) observe effect of feeding forages, grown under conditions which favor high nitrate accumulation, on the rumen function & general performance, (2) learn if effects observed in (1) can be duplicated by adding nitrate to the normal ration of cattle.
Vet. Med. 251
- N.J. Nutritional & Physiological Studies in Relation to Growth & to Milk & Butterfat Production in Dairy Cattle. II. Relationships Among Level of Soluble Carbohydrate Intake, Protein Intake, Digestibility of Nutrients & General Feeding Value of Rations. To study the factors of interest in this experiment, including feeding value of molasses, feeding value of babassu meal, & interrelationships among level of molasses, level of protein, & level of fiber in the ration.
Dairy Ind. 135-II
- N.Y.C. The Effects of Nutrition During Early Growth & Development, Especially the Effect of Prepubertal Nutrition, on the Mature

Reproductive Performance of Dairy Cattle. To determine the effects of maximum, normal & restricted intake of an otherwise adequately balanced diet during early growth & development on the subsequent reproductive performance of dairy cattle, both females and males.

An. Husb. 15-A (NE-1)

Ohio

The Effect of Adsorbents & Minerals on the Determination of Riboflavin & Other B-Complex Vitamins & on Their Availability to Animals. To (1) determine effect of adsorbents & minerals on present accepted methods of assaying for riboflavin and other B-complex vitamins; and (2) study effect of adsorbents and other B-complex vitamins to animals.

An. Sci. 48

Ohio

Factors that Affect Utilization of Nitrogen from Protein and Non-Protein Nitrogen Sources in Dairy Cattle. To study (1) losses of N in the urine of growing & lactating dairy cattle fed different levels & sources of protein & non-protein N including urea, & (2) effects of various sources & amounts of energy & effects of frequency of concentrate feeding on efficiency of N use.

Dairy Sci. 129

Okla.

The Carotene Requirements of Holstein Cattle for Reproduction and Lactation. To (1) determine carotene requirements of Holstein cattle for successful reproduction & normal lactation, and (2) study further breed differences as to carotene requirements of dairy cattle.

Dairy, Chem. 287

Okla.

The Correlation of Vitamin A Liver Stores with Plasma Vitamin A in Cattle. Study correlation of liver & plasma vitamin A levels in cows during reproduction & lactation; correlate liver stores & plasma levels & vitamin A & carotene with the amount in the diet & milk.

An. Husb., Chem. 747

Oreg.

Carotene & Vitamin A Utilization & Storage in Dairy Cattle of Different Nutritional Backgrounds as Determined by Analyses of Liver Obtained Through Biopsy & Milk Fat & Blood. To study (1) influence of natural feedstuffs through the year on carotene & vitamin A content of blood, milk & liver of Jersey & Holstein cows, & (2) effect of carotene & vitamin A history of dams & grand dams on use & storage of vitamin A & carotene in calves.

Ag. Chem., Dairy Husb., Vet. Med. 13-10

Pa.

Effect of Feeding Various Levels & Kinds of Protein to Dairy Cattle. To (1) investigate relationship between level & quality of protein intake & use of complete ration, and (2) study effect of over-feeding of protein to dairy cows in relation to milk production, body weight change, & observable changes in health.

Dairy Sci. 1155-D

- R.P. The Utilization of Concentrates in the Feeding of Livestock in Puerto Rico. To determine most economical quantities & qualities of concentrate feeds or grain mixtures that may be used satisfactorily for milk production.
An. Husb. 51
- S.C. Factors Affecting Feed Utilization by Ruminants. To learn (1) value of feed supplements to pasture & other roughages, (2) use of urea & other organic nitrogenous compounds as additives to molasses, & other farm grown carbohydrate feeds.
An. Husb. 93
- Tenn. Mineral Metabolism in Animals. I. Absorption, Distribution, & Physiological Behavior of Calcium & Phosphorus in Farm Animals. To (1) determine the normal distribution of these mineral isotopes administered by the various routes to cattle, and to study thereby in detail the normal absorption, utilization & skeletal metabolism of selected minerals in these animals, (2) measure endogenous losses of calcium & phosphorus & from these values determine maintenance requirements in the various species as a function of age, (3) determine the biological availability of calcium & phosphorus from the common dietary sources of ruminants, and simple stomached animals; and to study the effects of certain factors such as phytates, oxalates, ration, composition, etc. upon the availability; and (4) apply radio-isotope procedures concurrently with accepted indicator methods for the differential measurements of animal response to various dietary treatments.
An. Husb. Vet. Sci. 52
- Tenn. Mineral Metabolism in Animals. II. Interrelationships of Calcium & Phosphorus with Vitamins, Minerals, Hormones, & Other Factors. To (1) investigate & separate effect of metabolism of calcium and certain important factors which are known to influence their behavior in the animal body, and (2) study such elements & substances as are known to induce abnormal bone metabolism that are important for clarification of normal mechanisms & to aid in explanation of toxicological properties.
An. Husb. Vet. Sci. 53
- Wash. The Relation &/or Inter-Relation of Calcium, Phosphorus, Vitamin D, & Season to Reproductive Performance. To determine the need for added Ca, P, and/or Vit. D in rations of dairy cattle under western Washington conditions.
Dairy Husb., Chem. 784 (W-2)
- Wis. The Effect of Vitamins & other Organic Nutrients on the Growth Milk Production & Reproduction of Animals. To determine factors concerned with the adequate nutrition of farm animals as related to Wisconsin conditions.
Ag. Chem., An. Husb. 10

C. Management

- Alaska. The Value of Light for Increasing Milk Production, Conception Rate & Number of Observed Estrus Cycles During the Alaska Winter Season. To determine if lengthening period of light to which Alaska cows are exposed during winter favorably affects milk production, conception rate & number of observed estrus cycles.
An. & Dairy Prod. A1-1-3-2-(R)
- Ariz. The Effect of Cooled Drinking Water on Milk Production by Dairy Cattle During Periods of Prolonged High Environmental Temperatures. Determine effect of cooled drinking H₂O for dairy cattle on milk production during periods of prolonged environmental temperatures.
Dairy Ind. 386
- Ga. The Effect of the Intervals between Milkings on the Secretion Rate of Milk as Ascertained in Studies using Oxytocin. To (1) establish effect of various intervals of time between consecutive milkings upon hourly secretion rate of milk and butterfat, and (2) examine data procured in study for a revaluation of basic concepts concerned in the milk ejection phenomenon.
Dairy 64
- Kans. The Effects of Feeding & Management Practices on the Nutrition & Physiology of the Pregnant Cow and of the Young Calf. To determine the effects of (1) feeding & management practices on occurrence of mammary edema & other physiological disturbances during stages of advanced gestation & early lactation, (2) level of nutrients in ration of pregnant cow on transfer of nutrients to her colostrum, & to newborn calf, (3) digestion & absorption of nutrients from colostrum by newborn calf, and (4) relationship of antibody content of colostrum, milk and blood of cow to that of her calf.
Dairy Husb., Cham. 240
- La. The Effect of Certain Management Practices & Controlled Stress on the Physiological Response of Dairy Animals. To determine (1) value of succulent feeds, such as silage & irrigated pasture, in maintaining high milk production during summer, and (2) effect of various management practices on physiological response of dairy animals when subjected to controlled temperatures ranging from 60°F to 105°F at controlled humidity.
Dairy 540
- Mo. The Effects of Environmental Temperature on Growth & Related Related Reactions in Heifers, Birth to One Year. To study effects of 3 environmental temperatures: 1. optimum 50° F. plus or minus 50°F., 2. hot weather with daily range of 75°F to 95° F. daily, and 3. natural outdoor conditions.
An. Husb. Dairy Husb. Ag. Eng. 125-b

- Mo. Influence of Climatic Factors on Shelter Requirements of Dairy Cattle as Indicated by Physiological Reactions & Productivity. To (a) develop scientific information on effect of air movement at different temperatures & humidities upon dairy cattle & relate such information to requirements for housing dairy cattle, (b) study specific effects on animals of radiations from each of following spectral regions; ultraviolet, blue-violet, yellow-green, red-orange, near infrared, as compared to white light & to darkness, (c) study effect of radiations similar to sunlight at several intensities, & environmental temperatures, and (d) study effect of diurnally changing air temperature.
Ag. Eng., Dairy Husb. 66
- Mo. Measurements of Dairy Barn Heat & Moisture Production. To measure moisture production in a typical stall type dairy barn, and to estimate or determine that portion vaporized from the barn & litter surfaces & that portion produced directly from the cows.
Ag. Eng., Dairy Husb. 136-a (NC-23)
- Mo. Effect of Cyclic Changes in Temperature & Radiation on Skin & Hair Temperatures of Cattle. To measure skin & hair temperatures of cattle subjected to cyclic changes in air temperature & radiation in the Climatic Laboratory, and to use the results for prediction of animal behavior under similar outdoor conditions.
Ag. Eng., Dairy Husb. 136-e (NC-23)
- N.H. The Influence of Herd Management Practices on Milk Production, Efficiency of Reproduction, & Herd Replacement Maintenance. To study factors affecting (1) milk production such as association of month of freshening with milk production & with length of lactation, age with milk production, length of lactation with milk production, & length of dry period with milk production, (2) reproduction efficiency such as association of age of males & females with breeding efficiency, seasonal variation in breeding measured by conception rate, seasonal influence on frequency of oestrus, & inheritance as a factor, and (3) herd replacement such as fluctuation in sex ratio, mortality of young calves & normal replacement due to age, sickness, non-breeding, & other factors affecting heifers & cows.
Dairy Husb. 21
- N.C. Studies on the Effects of High Environmental Temperatures & Humidity on the Performance & Reproductive Efficiency of Farm Animals. To learn (1) extent environmental temperature & humidity affect reproduction in dairy bulls, & establish range in these factors where optimum fertility can be maintained, (2) endocrine physiology of dairy bulls subjected to thermal stress & its involvement in underlying mechanisms affecting body temperature regulation, (3) effectiveness of shades, fans, & sprinklers on production, fertility, body temperature, skin temperatures, & respiratory rate in swine & sheep during hottest weather, and (4) comparative heat tolerance of purebred & crossbred beef breeds.
An. Ind. 2, coop. USWB USDA

Ohio

The Use of Cattle Twins & Triplets to Study the Relative Influence of Inheritance & Management on Efficiency of Feed Utilization & Production. To (1) determine difference in feed intake per cwt. body gain at different stages of growth between members of cattle twin pairs on same ration as compared to differences between the means of twin pairs, when a full sib of same sex is available, corresponding comparison will also be made, (2) make comparisons similar to above when members of twin pairs are placed on 2 different rations with respect to the ratio of concentrates & roughage, (3) compare effects of 3 time milking during first lactation on yield of second lactation, (4) compare efficiency of feed use for growth with later efficiency of feed use for milk production in same animals, and (5) study variability of antibody response.

Dairy Sci. 36

S.C.

Seasonal Fluctuations in Milk Production. To study (1) relationship of stage of growth & composition of pasture plants to milk production, (2) value of harvested green crops, silages, & hays for maintaining milk production per cow by seasons, (3) effect of high atmospheric temperatures & cold, wet weather on persistency of milk production, and (4) influence of physiological changes, breed & color of dairy cows on milk production by seasons.

Dairy Husb. 71

D. Calves

- Alaska Raising Dairy Calves. To develop efficient rations & methods of raising dairy calves in Alaska.
An. Husb. 1-3-1 (P)
- Conn. The Development of Adequate Experimental Methods for Determining (Storrs) the Nutritive Requirements of the Young Calf. To evaluate & improve (1) efficiency & sensitivity of various experimental designs which might be used in calf studies, and (2) various biochemical methods to learn vitamin A in calf blood & other tissues, & use these methods to learn vitamin A status of the calf.
An. Ind. An. Dis., Stat. 139
- Ga. A Comparison of Systems of Feeding & Management of Dairy Calves for Herd Replacements under Georgia Conditions. To learn (1) effects & importance of increasing energy content of calf starters thru use of various fats & combinations of fats on growth, health, feed consumption, palatability & digestibility, (2) effects of various materials which might improve or affect palatability, (3) earliest age starter can be replaced by older animal type concentrate mixtures, & (4) growing effect of Coastal Bermuda grass hay.
Dairy Husb. An. Ind., Agron. 97
- Ga. The Nutritional Requirements of Dairy Calves. 1. The Use of Pasture Forage as a Component of the Ration of Dairy Calves. To (1) determine extent to which pasture forage may be used as a component of rations of young dairy calves, (2) investigate any special problems in management that may accompany the use of pasture forage. (3) determine kind and quantity of concentrates required to insure proper growth & development of calves on pasture, & (4) determine quantity of pasture needed to insure success from this feeding program.
Dairy 53-1
- Idaho Reconstituted Non-Fat Dry Milk Solids Supplemented with Aureomycin & Vitamins A and D for Feeding Dairy Calves. To determine (1) if reconstituted non-fat dry milk solids supplemented with vitamins A & D & aureomycin are satisfactory for raising dairy calves under Idaho conditions, and (2) length of time it is necessary to feed reconstituted non-fat dry milk solids to obtain normal growth if it can be used satisfactorily.
Dairy Husb., Vet. Sci., Chem. 183
- Kans. Factors Affecting the Nutrition of Dairy Calves. To (1) develop formulas for milk replacements and starters which will more adequately nourish dairy calves, (2) study systems of feeding including hay in starter to encourage greater roughage consumption, reduce cost of feeding & permit simplified ad libitum feeding of starter, (3) study effect of known nutrients such as trace minerals & unknown nutrient factors such as grass juice factor on growth & well-being, (4) study methods of using antibiotics & their effect on nutrient requirements, and (5) study effect of incorporating in calf feeds, antibodies from bovine blood & surplus colostrum.
Dairy Husb. 389

- Kans. The Effects of Feeding & Management Practices on the Nutrition & Physiology of the Young Calf. To determine the effects of (1) level of nutrients in ration of pregnant cow on transfer of nutrients to her colostrum, & to newborn calf, (2) digestion & absorption of nutrients from colostrum by newborn calf, and (3) relationship of antibody content of colostrum, milk & blood of cow to that of her calf.
Dairy Husb., Chem. 240
- Ky. The Influence of Newer Nutritional Factors on the Nutritional Requirements of Young Calves for Normal & Fast Growth. To evaluate & re-evaluate nutritional needs of young dairy calves in light of some of the newer nutritional factors.
Dairy Ind., An. Husb. 17
- Maine Feeding Antibiotics to Dairy Calves. To determine the effects of feeding antibiotics to dairy calves.
An. Husb., Chem. 66
- Mich. The Evaluation & Role of Various Dietary Principles & Ingredients in Calf Nutrition. To determine (1) effect of calf age on digestibility & protein & mineral metabolism of milk & non-milk calves, (2) age at which calf rumen becomes functional, (3) whey as a constituent of milk extenders for calf feeding, & (4) value of recently recognized nutritive principles in calf nutrition.
Dairy, Chem., An. Path. 47
- Minn. Nutritive Requirements of Dairy Calves. To determine (1) amount of each nutritional substance required by the calf for optimum nutrition, (2) physiological disturbances resulting from deficiency of these nutrients, (3) best means of supplying all the essential nutrients under practical feeding conditions, & (4) time of development of the rumen synthesis of nutrients & factors favoring this development.
Dairy Husb. Biochem. 1609-1510
- Mo. The Influence of Diet on the Growth & Development of Calves & Older Dairy Animals. To determine influence of diet with special reference to milk replacers & starter rations, specific mode of action of antibiotics, & to compare later growth & development of animals on the experimental rations with similar animals under normal feeding & management conditions.
Ag. Chem. 55 Dairy Husb.
- Mo. Environmental Requirements for Farm Animal Shelters. b. Determination of Operational Limits for Use of Open Housing for Young Calves. To determine effective environment within a selected open type young calf structure & determine any correlations between environment & calf growth & incidence of disease.
Ag. Eng., Dairy Husb. 136-b (NC-23)

- Mont. Nutritional Muscular Dystrophy in Calves. To (1) determine if muscular dystrophy can be induced in calves by avitaminosis E, (2) determine alph-tocopherol content of milk from cows of beef breeds in herds where calves are affected annually with muscular dystrophy, and (3) observe & obtain data on development of spontaneous muscular dystrophy in calves.
Vet. Res. MS 905
- N.Y.C. Influence of Feeding & Management Practices of the Young Upon Early Rumen Development & Subsequent Mature Performance. To study the extent to which variations in feeding & management practices of young ruminants can (1) modify "normal" progress of rumen development, (2) affect establishment of typical and/or satisfactory rumen flora, and (3) possible influence of these variations on animals' growth general health, & mature performance.
An. Husb. 100
- N. C. The Effect of Management & Housing Upon Growth & Health of Dairy Calves. To study relative merits of various systems of housing & related management practices for raising young dairy calves, as judged by growth, efficiency of gain, & general health with due consideration to economical aspects.
Dairy Husb. 64
- Ohio Further Studies on Fundamental Factors Affecting Roughage Utilization, Early Establishment of Rumen Function & Health of Dairy Calves. To study ways in which not only hay but various pastures & silages can be supplemented & utilized to best advantage by calves of various ages, & also to continue study of the factors which influence various digestive & synthetic processes of rumen & their relation to ruminant nutrition.
Dairy Husb. Vet. Sci. 74
- Okla. The Value of Dried Rumen Concentrate for Growth & Lactation. To (1) evaluate the growth response of dairy calves which are fed a commercial, dried rumen liquor concentrate, and (2) study effect of addition of dried rumen liquor concentrate upon the performance of lactating dairy cows.
Dairy 895
- Pa. The Feeding & Nutritional Requirements of Dairy Cattle. A. The Development of Milk Replacements in Rations of Dairy Calves. To determine value of supplementing milk replacement formulae with auro-mycin & vitamin B-12 for dairy calves.
Dairy Husb. 1155-A
- Pa. The Value of Grass Silage in the Diet of the Young Dairy Calf. To (1) determine feasibility of feeding high quality grass silage as only roughage to young dairy calf, (2) study effect of supplementing hay with grass silage in ration of young calves, & (3) investigate feeding maximum levels of roughage to calves while restricting concentrate intake.
Dairy Husb. 1155-C

W. Va. Methods of Feeding & Rumen Inoculation as they Effect the Growth and Development of Young Dairy Calves. To investigate the influence of 3 methods of calf feeding — control, limited hay, & limited grain—on growth, thrift, rumen flora, & milk production.
Dairy Husb., An. Husb. 62

Physiology, Biochemistry and Nutrition

A. Milk Secretion, Endocrinology

- Calif. (Davis) The Relation of the Pituitary, Hypothalamic Nuclei, and Adrenal Gland to Breeding Failure in Dairy Cattle. To (1) study nature of eosinophilic granules in glomerulosa of adrenal which increase in number during gestation in cattle, (2) make histological studies to determine cytology of adrenal pituitary & hypothalamic nuclei in normal & sterile animals, (3) make lab tests that for reliable measures of functional activity of adrenal gland in the cow, (4) screen adrenal hormones to find which compounds are important in reproduction, (5) study functional activity of adrenal gland during estrous cycle, & pregnancy, & (6) develop assay methods for various hormones concerned in reproduction.
An. Husb. 1550 (W-2) Coop. USDA
- Del. Serum Protein-Bound-Iodine (PBI) Levels & Their Relationship to Milk Production by Dairy Cattle. To study the feasibility of using the serum protein-bound-iodine level as a means of predicting the lifetime production of milk.
A. & P.I. 550-650 (NE-30)
- Fla. Sub-Normal Milk: Its Production, Correction and Utilization. To determine causes of sub-normal composition of cows milk & investigate correction feeding practices, & to study use of this milk in making various dairy products. Investigate pasture & field conditions on Florida dairy farms, produce sub-normal milk by controlled feeding of dairy cows, correct sub-normal composition by controlled feeding, correlate a study of rumen contents with relation to feeding practices, analyse daily milk samples for fat & solids-not-fat, & use sub-normal milk in making dairy products.
Dairy Sci. 667
- Ga. Some Effects of Various Hormone Treatments on Heifers Stimulated to Obtain Udder Growth Before Breeding and Upon Cows Artificially Induced to Lactate. To (1) determine the effect of various treatments of four to ten month old dairy heifers with combinations of stilbestrol and progesterone upon the immediately observed and continued udder growth, sexual activity and breeding efficiency, udder and body conformation, and lactation yields following calving, (2) ascertain whether there is a relationship between the degree of udder proliferation achieved and subsequent production levels, (3) ascertain whether artificially stimulated mammary glands have characteristics by which they may easily be distinguished from non-treated glands by simple inspection, and (4) evaluate various hormone treatments of non-breeder cows as to effect on udder growth, initiation of lactation, maintaining or increasing established lactation yields, future breeding efficiency, and on body weight gain and conformation.
Dairy, Vet. Med. 65

- Idaho Causes of Variation in the Fat and Solids-Not-Fat Content of Milk. To determine (1) influence of breeds, herds, cows, yearly environmental changes, seasons, stage of lactation, pregnancy, and age of cow on the fat solids-not-fat content of milk, (2) heritability of percent of fat and percent of solids-not-fat on an intraherd basis when adjustment for the important environmental effects has been made, (3) relationship between fat percent and solids-not-fat percent and to evaluate the influence of the factors given in objective (1) on this relationship, (4) value of the formalin titration test and the lactometer for determining the solids-not-fat content of milk, and (5) develop a selection index for fat and solids not-fat production that will maximize genetic gain in both traits.
Dairy Husbandry 180
- Ind. Studies on the Progestational Hormone in the Bovine. To determine (1) effects of progesterone on development & function of dairy cows udder, (2) progestational activity of blood during estrus cycle & gestation, (3) approximate time corpus luteum must be active to maintain pregnancy, & (4) mode of elimination of progesterone.
Dairy Husb. 656
- Kans. The Effects of Feeding & Management Practices on the Nutrition & Physiology of the Pregnant Cow & of the Young Calf. To determine the effects of (1) feeding & management practices on occurrence of mammary edema & other physiological disturbances during stages of advanced gestation and early lactation, (2) level of nutrients in ration of pregnant cow on transfer of nutrients to her colostrum, & to newborn calf, (3) digestion & absorption of nutrients from colostrum by newborn calf, & (4) relationship of antibody content of colostrum, milk & blood of cow to that of her calf.
Dairy Husb., Chem. 240
- Maine Prevention of the Occurrence of Hydrolytic Rancidity of the Milk Fat in Herd's Milk. To determine whether supplementary feeding of the dairy with lipase inhibiting material of nutritive and unobjectionable character, leading to prevention of butterfat test reduction in held milk samples, is economically feasible.
An. Ind. Home Eco. 21
- Md. The Physiology of Milk Secretion. To supply information as to the most important physiological factors which control milk secretion. Growth hormone will be injected in different amounts over varying periods of time & in different stages of lactation to determine effect upon lactation, duration of change, & quantity needed for good response.
Dairy Husb. G-38
- Mich. Effects of Hormonal Imbalances on Nutritional Requirements. To determine the effects on specific dietary needs resulting from (1) administering large doses of cortisone, estrogens, androgens, thyroid-active substances, insulin and growth hormone, (2) removing adrenals, gonads, thyroids, or from treatment with thiouracil or alloxan, & (3) it is hoped that these studies will further elucidate interactions between hormones & dietary factors in the body so that both may be used with greater efficacy & safety in the future.
Physiol., Pharam. 105

- Mich. Hormone Studies Related to the Physiology of Domestic Animals Including Investigations with Radioactive Isotopes. (1) Study mechanisms of thyroid function & variations in secretion rate of lab. & domestic animals. (2) Learn optimum levels & combinations of hormones for inducing mammary growth & lactation, (3) Investigate gameto-kinetic factor in cattle feces with reference to its specificity for pregnancy diagnosis.
Vet. Sci. Dairy Ind. Ani. Husb. 25
- Minn. The Physiology & Biochemistry of Lactation. I. Factors Involved in the Development of the Mammary Gland. II. Factors Involved in the Synthesis of Milk Ingredients. III. Factors Involved in the Evacuation of Milk from the Mammary Gland.
Dairy Husb. 1602
- Minn. Inheritance in Dairy Cattle. 2. Relationship of Mammary Development in Heifers to their Future Milk & Butterfat Production as Determined in D.H.I.A. Herds. To (1) determine value of mammary palpation of heifers as a means of predicting their production, (2) study use of mammary palpations of heifers as a means of proving sires at an early age, and (3) determine effect of nutrition & management on prediction value of mammary palpations.
Dairy Husb. 1616-2
- Mo. Endocrine-Genetic Interrelations in Milk Secretion. A. The Endocrine-Genetics of Milk Secretion. To (1) test various pituitary hormones which are now available for mammogenic activity to determine if the mammogenic hormone of the pituitary which is thought to stimulate growth of the mammary gland is the same as the recognized hormones or is a separate hormone, (2) test methods of measuring amount of progesterone in blood to determine level of progesterone in blood pregnancy of cattle, (3) study dwarf cattle to determine endocrine cause of dwarfism, trying thyroid replacement therapy, & (4) study excretion of androgens via the feces, & have isolated crystals which we hope to characterize this year, then giving attention to products of progesterone & adrenal hormone metabolism.
Dairy Husb. 80
- Mo. Hormone-Enzyme Interrelations in the Mammary Gland. A. Enzymes of the Mammary Gland. To study (1) "spreading factor" of the mammary gland, (2) energy metabolism of normal rat mammary gland during growth, lactation and involution, and (3) nucleic acids of rat mammary gland during growth, lactation, and involution.
Dairy Husb. 28
- Nebr. The Relationship Between Changes in Certain Blood Characters and Physiologic Function (Growth Rate, Productive Ability & Feed Consumption) To (1) determine changes in levels of certain constituents of blood with age, growth, pregnancy & productive ability, & (2) if significant relationships exist between blood constituent levels & physiologic function, to a. study prediction value of these blood constituent levels to future productive ability, & b. use physiological range of blood constituents as criterion for judging optimal dosage in administration of hormones, antibodies, etc. to obtain greater efficiency of productive abilities of animals & without serious detriment to the animal.
Dairy Husb. 452

- N.J. Relation of Endocrine Secretions to Milk Production and to Butter-Fat Content of the Milk. To study the influence of endocrine secretions on milk and milk fat production in dairy cattle with special reference to the thyroid, pituitary, and adrenals.
Dairy Husb. 129
- N.Y.C. The Physiology & Metabolism of Fats & Related Constituents in Animals. To study metabolism of fats and related constituents in lactation, & to establish basic factors influencing milk & fat yield & the nutritive value of fats & related compounds of milk.
Dairy Ind. Agron., An. Husb. 65, 91
- Ohio The Relationship Between the Serum Protein-Bound Iodine & Plasma Cholesterol in the Bovine & Their Possible Application to Dairy Production. To (1) ascertain degree to which dietary sources of iodine may interfere with specificity of protein-bound iodine (PBI) test as measure of thyroid activity in blood, (2) continue study of application of PBI test to a. detection of cows fed thyroprotein, & b. selection of cows that are hypothyroid & would most likely respond favorably to thyroid stimulation, (3) after completion of 1, study relation between PBI & cholesterol in blood along with eosinophil counts to measure possible stress on adrenal cortex due to thyroprotein feeding, & (4) ascertain degree of breakdown of protamone & other thyrodial substances in rumen by microorganisms.
Dairy Sci. 15
- Tenn. Feeding Thyroidally Active Materials to Dairy Cows. To determine effects of extended periods of feeding thyroprotein or thyroxine to dairy cows in successive lactations by use of monozygous twin dairy heifers.
Dairying 10
- Tenn. The Effect of Supernormal Growth of Dairy Heifers upon their Milking Qualities. To determine if there is a beneficial or harmful effect upon milk production ability of dairy heifers following rapid growth & fattening before their first lactation.
Dairying 27
- Wisc. The Physiology of Lactation in Cattle. To study mechanisms involved in initiation & maintenance of lactation, mechanics of machine milking, precursors of milk constituents, & enzymes involved in synthesis of milk.
Dairy Husb. 667

B. Rumen Digestion, Bloat

- Ark. The Influence of Quality of Roughage on the Microbiological Activity in the Rumen of Dairy Cattle with Special Reference to the Digestion of Carbohydrates & Synthesis of Protein & Fatty Acids. To determine proper ratio of roughage at various stages of maturity to concentrates for maximal microbiological activity in rumen as a basis for formulating more efficient rations for dairy cattle.
An. Ind. 331
- Calif. Physiology of the Domestic Animals. To study the physiology of
(Davis) ruminant stomach.
An. Husb. 941
- Colo. Intermediary Metabolism of the Ruminant as Influenced by Various Feeds. To determine (1) proportions of acetic, butyric, & propionic acid present in rumen under different feeding conditions, (2) proportion of these acids which results in highest milk production, (3) feeding system which will most closely approach ideal proportions of these acids, (4) effect of various feeds upon types & amounts of lower fatty acids in milk & (5) types & amounts of fatty acids & other rumen metabolic products associated with growth & gain in live weight.
Ani. Ind. 170
- Ill. Studies on Protein & Carbohydrate Metabolism in Ruminants. Especially as Affected by Rumen Microorganisms. Increase efficiencies in those metabolic processes of rumen microorganisms by which nutritional demands of ruminants may be satisfied.
Dairy Sci. 35-315
- Ind. Effect of Alteration of Diets on Digestive Disturbances of Ruminants. To (1) determine to what extent alteration of ratio of different constituents in diet affects ruminant digestion, (2) determine if acute bloat or engorgement toxemia occur as a result of changes, & (3) develop practical means to prevent & treat both diseases.
Biochem. , Vet. Sci. 724
- Iowa Physical and Chemical Aspects of Bloat. To (1) study effect of dietary components & therapeutic agents on physical & chemical characteristics of rumen ingesta, (2) determine relation of dietary characteristics to incidence of bloat, (3) determine various physical & chemical characteristics of rumen ingesta & of blood & other tissues from bloated animals, (4) ascertain efficacy of prophylactic procedures & therapeutic agents, & (5) determine relation of physical characteristics of animal to incidence of bloat.
An. Husb. Dairy Husb. Chem. Vet. Agron. 1267
- Kans. A Study of the Intermediary Metabolism of Rumen Microorganisms with Reference to the Formation of End Products from the Carbohydrates of Roughage. Elucidate mechanisms in formation of end products, as fatty acids, from the carbohydrates of roughage; study inter-relationship of apparently nonuseful end product methane with production of useful carbonaceous end products. Isolate enzyme systems capable of carrying on one step reactions found in carbohydrate fermentation.
Bact. Dairy Ind. An. Ind. 425 (NC-25)

- La. Fundamental Causes of Bloat in Ruminants. To determine (1) basic causes of bloat as related to physiological, biochemical, bacteriological, nutritional, & anatomical criteria, (2) relationship of various pasture management & grazing practices, pasture mixtures, soil types & soil fertility levels to occurrence of bloat, (3) mode of inheritance & frequency of occurrence of bloat in related animals, (4) value of various recommended treatments for bloat & their effects under controlled conditions on subsequent milk production, (5) relationship of the physical condition of the animal to susceptibility to bloat, & (6) whether or not bloat produced experimentally and under normal feeding practices are the same.
Dairy 840
- Md. A Study of Factors Affecting the Availability & Utilization of Nutrients in Feeds & Their Influence upon Body Composition, Growth, & Milk Secretion. To (1) conduct feeding & balance tests with dairy cattle, in which the nutritive value of different feeds & factors affecting their use will be studied, & accuracy of present methods of feed evaluation will be examined, & (2) study role of rumen microorganisms in the use of different kinds of feedstuffs & the chemical & physiological pathways by which the microorganisms & host animal assimilate various metabolites.
Dairy G-39
- Mass. Effect of Various Silages on Fatty Acid Levels in the Mature Bovine Rumen. To (1) ascertain levels of total steam volatile fatty acids in mature bovine rumen when various silages are fed, and (2) compare relative proportions of acetic propionic, and butyric acids produced under these conditions.
An. Husb. 1025
- Mich. Role of Rumen Fermentation in Cattle as a Procedure in Utilization of Farm By-Products. To (1) evaluate and improve techniques for growing and studying bacteria of rumen, (2) study types of microorganisms associated with digestion in normal & abnormal ruminant, (3) determine conditions favorable to microorganisms essential to health of cow and efficient use of farm by-products, & (4) study chemical changes brought about by rumen microorganisms.
Dairy, Bact. Ag. Chem. 73
- Mich. The Use of Nitrogenous Materials in Ruminant Nutrition. To determine extent to which urea or other simple N sources can be used in place of natural protein, and establish role of other nutrients such as trace minerals & organic growth promoting factors required to produce maximum digestion of cellulose & other rather indigestible components of feeds.
An. Husb. Ag. Chem. 118

- Minn. Tympanites or Bloat in Cattle and Sheep. To (1) attempt to clarify poorly understood motor control mechanisms in the ruminant stomach, especially the forestomachs, (2) attempt to develop a bio-assay procedure for toxic, bloat-producing legume extracts, (3) try to identify & chemically assay toxic substances present in bloat-producing legumes, (4) test legumes from various soil type conditions, soil treatments; growth stages, varieties & species for bloat-producing capacity, & (5) try to develop low-toxicity legumes for pastures.
Dairy Husb., Vet. 2610 (NC-27) Coop. Ad & PRB
- Minn. Neuroanatomical Investigations in Domestic Animals. Neuroanatomical Studies in the Bull Designed to Determine the Peripheral & Central Inervation of the Genital Organs. Neuroanatomical Studies in the Cow Designed to Determine the Peripheral & Central Innervation of the Lateral Abdominal Wall and the Udder and to Improve the Clinical Technique of Paravertebral Aesthesia.
Vet. Sci. 2618
- Miss. The Effect of Antibiotics and Type of Ration on Rumen Function as Determined by Changes in Microbial Flora. Synthesis of Vitamins, and Synthesis of Proteins. To determine effect of antibiotics and type of ration on (1) cultural & morphological types of microorganisms in fully developed rumen, (2) synthesis of vitamins in rumen, and (3) synthesis of proteins in rumen.
An. Dis. FN-1
- Miss. Investigation of Artificial Rumen & In Vivo Techniques for Measuring the Rumen Breakdown of the Resistant Fraction of Small Samples of Forages. To (1) develop system of evaluating digestibility of forages by ruminants which is adaptable to small quantities of forage & which is less expensive & time consuming than existing systems, & (2) test application of this system to studies on effect of stage of maturity at cutting & methods of preservation of various forage crops on their digestibility.
Dairy Husb. FG-6
- Mo. Ruminant Digestion. (152-a) Rumen Culture. To (1) set up in lab an artificial rumen with conditions simulating those found in natural rumen, (2) study by quantitative chemical analysis the changes that occur in a ration as it is fermented in artificial rumen, (3) study methods of preserving rumen organisms so they will be available for inoculation of artificial rumen, & (4) study effects of these preserved rumen microorganisms on a ruminant.
Ag. Chem. Vet. Med. 152
- Mo. The Specific Role & Synergistic Effects of Microorganisms in Dairy Cattle Nutrition. To determine specific role & requirements of each microorganism in the rumen flora, including biosynthesis of vitamins in the use of feeds by dairy animals.
Dairy Husb. Chem. An. Husb. Vet. Med. 246
- Mo. Ruminant Digestion. a. Development & Testing of Techniques for the Study of Ruminant Digestion. To develop surgical, chemical, & bacteriological techniques which can be routinely applied to the study of ruminant digestion.
An. Husb. Chem., Vet. Med. 168-a

- Mo. Pasture Improvement. d. The Incidence of Bloat & Methods for Its Control. To determine (1) under what conditions pastures produce a high incidence of bloat, and (2) if simple methods of management can be used to control it.
An. Husb. 154-d
- Mo. Changes in the Physical Structure of Roughages During Growth & Digestion. To note changes in physical structure, as indicated by X-ray diffraction & electron microscopy, of wheat & Lespedeza during their growth & digestion by rumen microorganisms.
Phys. 250 (NC-25)
- Nebr. The Mechanism of Digestion of Polysaccharides from Roughages by Microorganisms of the Rumen. Identification of products of digestion of polysaccharides from roughages by bacteria from rumen. Investigation of mechanism of utilization of degradation products of polysaccharides.
Dairy Ind. 491 (NC-25)
- N.H. Investigation on the Microorganisms of the Bovine Rumen. To (1) develop more efficient methods for isolation and cultivation of the microorganisms living in the bovine rumen, (2) classify these organisms, and (3) determine their biochemical role in the ruminant digestion process.
Bact. 120
- N. Mex. Rumen Digestion of New Mexico Roughages. To determine (1) influence of various New Mexico roughages on bovine rumen flora, (2) digestibility of these roughages when fed singly & in combination, & (3) effective supplements needed to obtain maximum rumen digestion of these roughages.
Dairy Husbandry 96
- N.Y.C. Influence of Feeding & Management Practices of the Young upon Early Rumen Development & Subsequent Mature Performance. To study the extent to which variations in feeding & management practices of young ruminants can (1) modify "normal" progress of rumen development, (2) affect establishment of typical and/or satisfactory rumen flora, & (3) possible influence of these variations on animals' growth, general health & mature performance.
An. Husb. 100
- N.C. A Study of the Essentials of the Ruminant Diet. To investigate by means of the purified-diet method, (1) basic nutrient requirements of ruminant, & (2) nutritional & physical interrelationships of diet.
Dairy Ind., An. Ind. 54
- N.C. Studies on Bloat in Ruminants. Learn normal physiology of eructation. Produce bloat experimentally. Learn chemical & physiological differences between feeds & ingesta associated with bloated animals & those associated with normal animals.
An. Ind., Dairy Ind. 60

- Ohio Bloat in Ruminants. 1. Causes. To investigate causes of bloat based on clinical observations, examination of rumen samples for hydroscopic properties, volatile fatty acid content & microorganism variations & examination of blood concentrations of nitrogenous constituents.
Vet. Sci., Dairy, An. Sci., Agron. 80-1
- Okla. The Effect of Steroids on Microbial Carbohydrate Utilization. To determine (1) effect of cholesterol, estradiole, stilbestrol, estrone, testosterone, progesteron, vitamin D, & cortisone in respect to stimulation or inhibition of microbial growth & use of glucose, maltose, sucrose, starch, (2) if the microorganisms under observation are capable of using any of the steroids listed as a sole source of carbon for growth & reproduction, & (3) if the steroids affect extracellular enzyme production.
Bact. 892
- Va. The Isolation, Propagation, & Nutrition Requirements of Cellulose-Decomposing Bacteria Found in the Rumen of Cattle that are Consuming High-Roughage Feeds. To (1) isolate cellulose-decomposing bacteria from rumen of cattle & design methods for propagation in quantity, & (2) investigate nutritional requirements of cellulose-decomposing bacteria as to carbon, N, minerals, & unidentified growth factors.
Biochem., Nutr., An. Path., An. Husb., Dairy Husb., Biol. 8438
- Va. The Effect of Various Protein & Non-Protein Nitrogen Sources on Protein Assimilation by Rumen Microorganisms. To (1) determine if non-protein N of types used in cattle feeds suppresses decomposition of feed protein by rumen microorganisms, & (2) compare proteins of forage crop stems & leaves, seed proteins, & animal proteins of high biological values of N sources in protein synthesis by rumen microorganisms.
Biochem., An. Husb., An. Path., Dairy Husb., Biol. 8439
- W. Va. Methods to Increase Non-Protein Nitrogen Utilization by Ruminants. To evaluate a variety of non-protein nitrogenous compounds which may be useful as replacements for protein concentrates in ruminant rations containing a high proportion of roughage.
Am. Husb., Biochem. 69
- Wis. The Functions of the Rumen & Organisms Associated with the Rumen in the Nutrition of Dairy Cattle. To investigate the digestive processes occurring in the rumen of the dairy cow & their relation to fulfillment of her nutritional requirements for maintenance, production, & reproduction.
Dairy Husb., Biochem., Bact. 758

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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

June 1956

Section a

CEREAL CROPS

FIELD CROPS

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference, certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

Ala. The Control of Insects Attacking Corn and Grain Sorghum. To (1) study factors affecting seasonal abundance of important insect pests; (2) cooperate with plant breeders in selecting varieties and strains resistant to attack, particularly the rice weevil; and (3) develop control measures for use in the field and in storage.

Ent., Zool. 314

Ala. Economics of Feed Production and Utilization. To (1) collect data from selected farms on input used in producing feed crops, esp. roughages, and output from feed crops, (2) analyze data in light of farm conditions & experimental results, and (3) evaluate farming systems using varying amounts of cash field crops and livestock.

Agr. Econ. 316, coop. USDA

Ala. The Tocopherol Content of Feeds and Forages and the Significance of Vitamin E in the Nutrition of Farm Animals. To (1) determine concentrations of total tocopherol, alpha tocopherol, & unsaturated fatty acids in representative feeds, feeding stuffs, & forages, as influenced by stage of maturity, environmental conditions & processing or treatment & storage; (2) survey blood serum levels of tocopherol, unsaturated fatty acids, & vitamin A in cattle & sheep under various feeding practices, in various diseases; (3) determine influence of diet & dietary factors on development & cure of nutritional muscular dystrophy in rabbits & of "white muscle disease" in cattle; (4) ascertain cause & nature of lightened, slate-grey color of muscle in "white muscle disease," & analogous condition in rats & rabbits; & (5) determine if vitamin E is important in swine nutrition.

Anim. Husb. & Nutr., 323

Ala. Grain and Forage Harvesting, Processing and Storage. To develop improved methods & to adapt equipment for (1) harvesting, conveying, drying, storing, mixing, grinding, & feeding grains, (2) harvesting, conveying, drying, storing, mixing, grinding, & feeding hay crops that will reduce labor requirements & processing costs & improve hay quality, (3) feeding silage crops that will reduce labor & processing costs & improve silage.

Agr. Engin., Hort, 572

Alaska Handling and Storing High Moisture Content Cereal Grain. To (1) make engineering tests of batch type drier developed by Alaska Experiment Station; (2) test effectiveness of drying rates of 6 & 12 CRM per bushel in preventing spoilage & removing moisture from grain in bins; & (3) continue observations to determine safe moisture content for bin storage of barley without air circulation.

Agr. Engin., AL-1-4-7

- Alaska Cereal Crop Production. To determine effect of cultural practices & their interrelationships on yield and nutritional and industrial value of recommended cereal crop varieties in Alaska.
Agron. 39
- Alaska Use of Mutagenic Agents in Cereal Crop Improvement. To (1) aid the development of superior cereal varieties for Alaska through the production of desirable mutations by mutagenic agents, & (2) compare effectiveness of different mutagenic treatments as measured by genetic changes in cereal crops under Alaskan conditions.
Agron. 43
- Alaska Survey of Economic Crop Diseases. To investigate the identity, distribution, and relative importance of the diseases of economic and related crop plants in Alaska.
Pl. Path., Al-1-8-I(P), coop. USDA
- Alaska Breeding New Cereal Varieties for Alaska. Develop improved cereal varieties (wheat, oats, barley) for release to growers in Alaska.
Agron. 38, coop. FCRB
- Ariz. The Economics of Marketing Hay and Feed Grains in Arizona. To determine (1) movement of hay & feed grains within Arizona & between Arizona & other states in Southwest; marketing channels & methods through which movements take place; transportation, adequacy of market information, & storage. (2) Importance of marketing agencies & outlets regarding volume & efficiency of movement. (3) Functions of market mechanisms, costs & margins which are incurred. (4) Role of commercial mixed-feed & processing industries in interstate movements of concentrates.
Agr. Econ., (WM-20)
- Ariz. Fertilization of Field Crops on Alkaline-Calcareous Soils, of Different Types, Under Semi-Arid and Irrigated Conditions. To determine effect of deep placement of phosphate with and without soil correctives and nitrogen, cultural programs, quality of irrigation water and irrigation practice on crop response and analyses of feed crops.
Agr. Chem., Soils, Agron. 266, coop. Ext. Serv.
- Ariz. The Improvement and Culture of Small Grains. To (1) develop new varieties of small grains better adapted to Arizona environmental conditions, (2) test new varieties of small grains for grain production, & (3) develop improved cultural practices for the production of barley, wheat, & oats.
Agron. 305

Ariz.

Breeding Sorghums for Increased Uniformity in the Field and for Improved Agronomic Characteristics and Increased Production of Grain and Forage. To (1) discover cause of and reduce variation in height of Early Hegari, Martin's Milo, and certain other sorghums produced under certification, thereby improving quality of seed marketed; (2) develop thru breeding methods improved adapted varieties of grain sorghums and sorgos for local use as feeds or by industry; and (3) study inheritance of important genetic characters in sorghum plant.

Pl. Brdg. 309

Ariz.

The Utilization of Arizona Crops in Chick Diets. To improve chick diets, studying extent to which Arizona crops such as milo, cottonseed meal, and barley can be used, and vitamins, amino acids, and unidentified factors that may be necessary to supplement such diets.

Poul. Husb. 364

Ariz.

The Biology and Food Preferences of the Khapra Beetle as They Relate to Grain Marketability. To obtain basic information on biology, ecology, & economic injury of khapra beetle under conditions prevailing in the southwest.

Ent., Agron., 389 (WM-16), coop. USDA

Ark.

Nutritive Value of Rice and its By-Products. To determine (1) the effect of processing on the content of various components of the vitamin B complex and the chemical composition of whole rice and its by-products; (2) effect of milling on contents of various B components in the different breaks and grades of rice by-products, (3) effect of soil treatment, fertilization and cultural practices on content of the various components of the vitamin B complex and the chemical composition of rice, (4) effect of various production and processing methods upon content of the various components of the vitamin B complex, and chemical composition of processed and nonprocessed rice and its by-products; and (5) most efficient method of par-boiling of rice to obtain maximum vitamin retention and minimum amount of breakage due to shelling and milling.

Agr. Chem. 101

Ark.

Ground Water, Resources and Recharge, in the Rice Growing Area of Arkansas. To determine (1) permeability & safe yield of the tertiary water-bearing sands underlying rice growing areas; (2) feasibility & costs for recharging the Pleistocene water-bearing sands in areas where excessive pumping has depleted shallow wells; & (3) water level trends & verification or disapproval of safe yield calculations previously made.

Agr. Engin. 106

- Ark. Improvement and Testing of Winter Small Grains. (1) Develop varieties of winter small grains with high yielding ability that are as good or better than recommended varieties & are superior in 1 or more of following: lodging resistance, non-shattering, good quality of grain, winter hardy, acceptable uniformity of grain & plants. (2) Learn mode of inheritance of agronomic characters & association of component characters with yield; test new promising strains of small grains & new varieties & strains proposed for release to compare performance with present proven varieties.
Pl. Path. 124
- Ark. Rotations and Fertilizer Experiments. To (1) continue a long-time rotation & fertilizer experiment begun in 1921; (2) study effects on the soil of long-time rotations & fertilizer treatments rotation of corn, oats, wheat & clover.
Agron. 125
- Ark. Hybrid, Variety, and Cultural Experiments with Corn. To (1) study adaptation of different hybrids and varieties to different sections of Arkansas; (2) study effects of different planting dates upon different maturity groups of hybrids; and (3) conduct cultural experiments with corn (other than fertilization, rotations, and irrigation).
Agron. 128
- Ark. Improvement, Production, and Management of Large Seeded Legumes. To (1) obtain superior varieties or strains of soybeans and other large seeded legumes such as vetch, winter peas, that are especially suited to Arkansas conditions; (2) study effects of planting methods on production; and (3) test performance of promising strains and varieties.
Agron. 137, coop. USDA
- Ark. Biology and Control of Corn Earworm. To study effect of environmental factors on seasonal history and abundance of corn earworm, as a means of improving control procedures and ability to anticipate damage, and also study materials and methods used in insecticidal control on major crops and other cotton, with emphasis on control in sweet corn.
Ent. 183
- Ark. Control of Rice Diseases. To (1) produce and test rice varieties for resistance to diseases; (2) test effects of host nutrition, crop rotation, and irrigation on severity of rice diseases; (3) study effects of seed treatments on emergence and yield of varieties.
Pl. Path. 226, coop. USDA

Ark. Biology and Control of Rice Field Mosquitoes. To (1) obtain better information on flight habits of rice field mosquitoes; (2) coordinate mosquito control with control of other rice field insects, especially rice water weevil; (3) improve & cheapen preparation of type of mosquito larvacides developed in course of the work; & (4) determine factors in variable performance of larvacides.
Ent. 258

Ark. Development of Forage and Grain Types of Sorghums. To develop (1) thru breeding, introduction and selection, varieties of forage and grain sorghums with high yielding ability which are suited to Arkansas; and (2) varieties that will withstand heat, drouth, set seed during warm weather and resistant to ravages of birds.
Agron. 274

Ark. Supplemental Irrigation Investigations with Agronomic Crops. To (1) evaluate methods of learning critical soil moisture levels for irrigation, (2) learn optimum rate & grade of fertilizer & optimum time & method of application for agronomic crops grown under irrigation on major soil types of state, (3) evaluate yield responses of certain selected agronomic crops when irrigation is by sprinkler & furrow methods, (4) learn effect of plant population, planting dates, & other cultural management practices that may have possibilities of influencing degree of response of agronomic crops to supplemental irrigation, (5) evaluate effect of land leveling operations required for furrow irrigation on soil fertility properties of soil & resultant yield of certain agronomic crops, & (6) study methods of increasing infiltration rate of irrigation water into soil in which rate is slow.
Agron. 311

Ark. Investigations with New Crops. To (1) investigate growth habit and reproducing ability of new agronomic field crops for Arkansas which give indication of being adapted to the state; (2) evaluate in more extensive field tests new crops which indicate in preliminary observations that they may be of value to farmers in Arkansas; and (3) evaluate any native plants which have potential value to Arkansas agriculture.
Agron. 323 (S-9)

Ark. Biology and Control of Certain Important Diseases of Oats and Wheat in Arkansas. To (1) develop new or better methods of prevention & control of certain important diseases of oats; (2) identify causal agents & study life cycle & epidemiology of different parasites, except anthracnose, including identification of different races whenever they may be involved; & (3) breed varieties of oats & wheat that will be resistant to these diseases & be otherwise desirable.
Pl. Path., Agron. 324 (S-13)

Ark. Conditioning and Storage of Small Grains, Seeds and Legumes. To (1) study effect of temperature and moisture on keeping qualities of grain as indicated by odors, germination, and viability, of small grains, legumes, and seeds, & milling quality of rice; (2) determine quality of grain stored under various conditions for different periods of time; (3) study effect of external sterilizing grains on keeping qualities, germination, and milling; and (4) study effect of aeration on drying and keeping qualities of small grains, seeds, and legumes.
Agr. Engin. 325

Ark. Biology and Control of the Southwestern Corn Borer in Arkansas. To determine (1) severity of damage in different areas of state; (2) life & seasonal history; (3) timing & toxicity of various insecticides & their effect on yield; (4) favorable planting date & varieties showing resistance to pest.
Ent., Agron. 350

Ark. Improving Protein Efficiency of Cereal Grains with Amino Acids. To improve quality of proteins of plant foods such as cereal grains by adding amino acids which are deficient.
Agr. Chem. 355

Ark.

The Effect of Fertility, Crop Residues, and Cultural Practices upon Crop Yields and Maintenance of Soil Organic Matter Content. To (1) compare relative effects of a vetch cover crop with those of extra fertilizer equivalent to the cost of establishing a vetch cover crop under different intensities of cropping, using as indexes for measuring objectives one thru five crop yields (or economy of production), and soil organic matter maintenance; (2) compare corn with soybeans when both crops are harvested as grains; (3) compare sweet clover with lespedeza when both are used as green manures; (4) compare sorghum as an organic matter producer with lespedeza, sweet clover, and soybeans drilled in rows for grain; (5) compare soybeans drilled solid for green manure with sorghum, lespedeza, and sweet clover likewise used as green manure; (6) measure actual rates of increase or decrease in organic matter content of the soil under different fertility and cultural practices; (7) measure amounts of organic material produced under certain fertility and cultural practices; and (8) study effects of different cropping systems upon any changes in the fertility status of the soil.

Agron. 361

Ark.

Corn Fertilizer and Spacing Experiments. To (1) determine effects of 5 N levels and 3 spacings on yields of hybrid corns; and (2) study effect of above factors on ear size, number of ears per stalk, and on root and stalk lodging of two hybrids--a late-maturing prolific and an early, non-prolific hybrid.

Agron. 363

Ark.

Factors Affecting the Uptake of Phosphorus from Rock and Superphosphate. To (1) evaluate effect of long-time fertilization with rock & with superphosphate on efficiency of uptake of P by crops from current applications of superphosphate; (2) determine effect of above past treatments on available phosphorus per acre; (3) correlate available P so determined with soil tests for available P; (4) measure bonding energy of Ca to root systems of test crops used as a possible explanation for uptake of P from rock phosphate; (5) compare in the field efficiency of rock phosphate, superphosphate, & combinations for oats & corn, grown with & without a green manure crop, & for annual, biennial & perennial legumes & grass; & (6) study in the greenhouse the effect of green manuring on P availability from insoluble phosphates.

Agron. 368

Ark. An Economic Appraisal of the Marketing of Soybeans and Small Grains Grown in Arkansas. To (1) determine present areas of production, methods of marketing, availability, and location of marketing facilities, and location, type and cost of storage available for grain crops; (2) evaluate present methods of marketing and present marketing facilities for handling grain crops produced in Arkansas; (3) estimate present use of feed grains and their source of supply; and estimate future grain demands; and (4) investigate competitive position of Arkansas grown feed grains in terms of prevailing marketing methods and facilities and present and potential demand.

Rural Econ. & Sociol. 375 (SM-11), coop. USDA

Ark. Offerings in the Market of Various Forms of Rice and Methods of Processing and Preparing the More Nutritious Forms of Rice to Increase Their Marketability. To (1) determine in the purchase of rice, the forms & amounts purchased by families in retail outlets; & (2) study & develop methods of processing & preparation for the more nutritious forms to insure their acceptability in the market & in the home.

Home Econ.; Rural Sociol., Chem. 383 (SM-13)

Ark. An Economic Appraisal of Production Practices and Enterprise Combinations on Rice Farms in Arkansas. To (1) relate relative efficiency of producing rice & other adapted crops to major soil & water resources situations on rice farms; (2) appraise costs & returns effect of irrigation of crops other than rice for each major resource situation, (3) appraise costs & returns potentials from adoption of best combination of improved production practices & techniques for each major resource situation, (4) evaluate costs & returns aspects of rotations on rice farms for each major resource situation, & (5) learn relative inputs & yields for long, medium, & short grain varieties of rice.

Agri. Econ., Agron. 390, coop. USDA

Ark. Improved Marketing of Grains Through Insect Control. To (1) investigate kinds of insects damaging cash grain in farm storage & evaluate the effects on quality & market value of the grain, (2) determine sources of infestations & factors favoring population increases & correlate cost of controlling these factors, (3) determine importance of various species & evaluate factors contributing to their development, & (4) determine better methods for direct & indirect controls & evaluate these in terms of cost, change in quality, & market value.

Ent., Econ., & Sociol. 391

Ark.

Studies of Physiological Factors Affecting the Growth of Agronomic Crops Grown under Irrigation. To (1) determine critical time intervals of moisture stress which may affect yield & quality of certain selected agronomic crops; (2) learn water needs of agronomic crops under varied levels of soil fertility, moisture conditions & stages of plant growth; (3) learn effect of supplemental irrigation on date & length of fruiting periods, maturity date, yield, & composition of agronomic crops, (4) study effect of soil & air temperatures, & relative humidity as modified by supplemental irrigation on physiological responses of the agronomic crops, & (5) learn possible effects of deposits of Fe & Mn from sprinkler applied irrigation water upon the physiology of some agronomic crops, cotton, corn, soybeans, sorghum, & legume-grass pastures.

Agron. 392

Ark.

Studies of Physiological Factors that Influence the Nutritional Balance and Development of the Rice Plant. (1) To learn nutrient deficiency symptoms & correlate tissue analysis with these deficiency symptoms; (2) learn possible relationship between mineral balance & straighthead of rice; (3) study effects of soil alkalinity on nutritional balance of plant; (4) learn effect of cultural practices as spacing, variety & water management on rice development.

Agron., Pl. Path. 397, coop. FCRB

Ark.

The Response of Winter Small Grains to Management Practices. To (1) compare methods of seedbed preparation; (2) learn factors contributing to association of rainfall & yield; (3) compare hay & grain yield of a non-winterhardy oat variety sown in December with a spring sown variety; (4) learn effects of different crops seeded with winter oats on yields of forage in fall & winter months; (5) learn quality of hay from fall & spring sown oats cut at different stages of maturity & factors contributing to hay quality.

Agron., Anim. Husb. 410

Ark.

Weed Control in Rice Production. (1) Develop either a cultural, chemical, or a combination method for controlling Echinochloa crusgalli; (2) evaluate herbicides for controlling Sesbania macrocarpa, Aeschynomene virginica, Heteranther limosa & other weeds infesting rice fields; (3) study tolerance of rice to various herbicides; (4) study the physiological & morphological characteristics of rice as influenced by herbicides; (5) study methods of controlling weeds infesting rice field canals.

Agron. 419

- Calif. Aphid-Borne Virus Diseases of Field Crops. To investigate virus diseases and aphid vectors of such field crops as sugar beets, potatoes, tomatoes, with emphasis upon nature of transmission, factors influencing spread, and possible control measures.
Ent. Parasitol. 1365-A
- Calif. Biochemical and Physiological Aspects of Disease Resistance Inherited by Plants. To study intensively chemical composition of selected strains & varieties of important crop plants relative to resistance to specific diseases.
Agron., Pl. Path., Bot., 1552
- Calif. The Application of Quantitative Genetics to Plant Breeding Theory and Practice. To (1) study appropriate metrical characters in plants in order to evaluate genetic & environmental forces governing these characters; & (2) apply results to breeding of improved varieties of crop plants.
Agron. 1562
- Calif. Investigation of the Nature of the Virus Diseases of Cereals & Leguminous Crops in California with Reference to Transmission, Variability, Effect on Yield, Host Range and Varietal Reaction. To learn (1) interrelation of recognized viruses of wheat, oats & barley, (2) nature of other viruses & virus-like diseases of cereals & grasses & their relation to native & cultivated grasses; (3) viruses in alfalfa, clovers & other legumes by identification; (4) methods of dissemination & relative economic importance of viruses upon legumes being grown for forage & seed production; (5) correlate studies with Agronomy Department.
Pl. Path. 1652, coop. Ext. Serv.
- Calif. The Biology and Control of the Khapra Beetle. To make comprehensive study of Khapra beetle, including facets of its biology, ecology, normal and abnormal physiology & devise control measures for protection of stored products.
Agron. 1671 (WM-16), coop. USDA
- Colo. Genetic Studies and Linkage Relationships in Barley. To (1) establish the behavior of genes, their interrelationships, their inheritance, and map linkage groups as they occur on the chromosome; (2) keep viable the collection of genetic stocks used in linkage studies; and (3) use the findings in breeding valuable barley varieties.
Agron. 8, coop. USDA
- Colo. Inheritance Studies on the Disease Resistance in Small Grain. To (1) study inheritance of small grain disease resistance; and (2) use the facts obtained in the production of disease resistant varieties with high yield and quality.
Agron. 10

Colo. Improvement, Management, and Classification of Poorly Drained Soils of the San Luis Valley of Colorado. To (1) determine optimum level or levels of water table for efficient irrigation and drainage; (2) study efficiency of methods of controlling salinity & base exchange, including irrigation, drainage, soil amendments, & leaching; (3) determine crop management practices contribution to soil improvement & more crop production; (4) study effects of irrigating with drainage water, with & without amendments, on salinity, alkali, soil structure, & plant growth; & (5) improve techniques & standards for classifying poorly drained, saline & alkali soils of San Luis Valley.

Agron., Engin. 13

Colo. The Influence of Irrigation Practices on Soil Structure and Plant Growth. To learn effect of methods of (1) application of irrigation water on moisture distribution, surface crusting, & plant emergence & growth; (2) land preparation for irrigation & effect of subsequent tillage operations on soil tilth.

Agron., Agr. Engin., Soils 17

Colo. The Effect of Fertilizers on the Yield and Quality of Crops Under Dry Land Conditions of Colorado. To determine (1) conditions in dryland areas affecting crop response to fertilizers including soil type, cropping system, climate, available soil moisture, initial level of available nutrients & crop species; (2) comparative effectiveness of different types & combinations of fertilizer elements as well as rate time, method of application fertilizers on yield & quality of field crops.

Agron. 18, coop. USDA

Colo. The Baking of Flour Mixtures at High Altitudes: Part III. To study (1) how constituents of flour mixtures behave under influence of pressure, humidity, and temperature variables; (2) fundamental principles involved in behavior; (3) effect of changes in kinds and amounts of constituents upon texture and acceptability of products; (4) suitable methods of mixing; (5) formulas for ready mixes; and (6) tests of resulting products by histological, chemical and physical means.

Home Econ. 60

Colo. Alternatives to Wheat in Eastern Colorado. (1) Assemble & summarize information on better methods, species & practices used in establishing grass & on grazing use obtained, in experiments conducted by State & Federal stations, (2) assemble & appraise methods, practices, costs & returns of selected farmers & ranchers who have reseeded old cultivated land or depleted pasture, (3-4-5) learn, for typical farming situations the investments, other costs, & estimated returns from establishing pasture on cropland to be diverted from wheat production & on depleted native pasture; under which farming situations establishment of pasture & introduction or expansion of livestock is feasible; changes required in organization & operating methods on typical wheat farms if some land were turned to grass; (6) outline major obstacles to adoption of pasture & livestock farming systems on typical dryland wheat farms.

Agr. Econ., Agron. 98, coop. USDA

Colo. Maintaining Marketability of Wheat in Farm Storage and Country Elevators Through the Control of Insects. To (1) obtain technical data on distribution, infestation, reservoirs, & conditions favoring high population densities of principal species of insects affecting marketability of wheat on farm & in country elevators; (2) determine value of various commercial protectants & fumigants to improve marketability of grain under farm storage; (3) study role of lesser grain borer as a factor in lowering quality & marketability of wheat; & (4) determine effect of insect damage in terms of economic loss to farmers & estimate increased returns from use of protective treatments.

Ent. 217 (WM-16)

Conn. A Genetic and Cytological Study of Hereditary Characters in Plants. Study of the inheritance of factors affecting fertility, endosperm development and similar characters directly influencing yield, and testing new factors by crossing with representative factors of each chromosome group already classified to determine the arrangement of the factors in the chromosomes and their stability.

Genet. 501, coop. Rockefeller Foundation

Conn. The Effects of Inbreeding and Crossing upon Seed and Vegetatively Propagated Plants. Successive generations self-fertilized and compared with original types and strains separated after uniformity is attained, and further self-fertilized and tested for complete fixity of type and similarity of genetic constitution, to determine whether all inbred plants are reduced to the same degree when the reduction in growth ceases and whether, when reduction in growth ceases, constancy and uniformity are retained.

Genet. 502, coop. Rockefeller Foundation

- Conn. Variation Resulting from Alteration in Position or Arrangement of Nuclear and Cytoplasmic Components of the Cell. To determine to what extent naturally occurring and induced alterations in cell contents may affect growth and the expression of transmissible characters.
Genet. 505
- Conn. The Influence of Soil Factors on the Herbicidal Effect-
(Storrs) iveness of Certain Carbamates. To determine the influence of soil moisture, texture, organic matter content & pH upon herbicidal activity of these carbamates; isopropyl N-(3-chloro-6-methoxyphenyl) carbamate, sec. butyl N-phenyl carbamate; isopropyl N-(3-chloro-6-methoxyphenol) carbamate, isopropyl N-(3-methyl-phenyl) carbamate, isopropyl N-3, 6-dichlorophenyl carbamate, & isopropyl N-(3-chloro-phenyl) carbamate.
Agron. 221 (NE-12)
- Conn. Physical Properties of Soil as Influenced by Crop Pro-
(Storrs) duction. To (1) determine physical changes in soil under continuous corn, with rye, cover crop, when fertilized with widely varying amounts of N, phosphoric acid & potash; (2) study effect of root action, with & without tillage, on soil aggregation; & (3) make lab study of effect of aeration conditions on redox potential & poise of soil systems.
Agron. 222 (NE-11)
- Del. Green Manuring Practices and Their Effect on Corn Yields.
To learn (1) effectiveness of different green manuring methods for increasing corn yields; (2) rate of breakdown of various plant residues & nature of soil organic matter produced.
Agron. 234
- Del. Corn Fertilization. To determine the amount of fertilizer nutrients that can be used efficiently by corn grown under good cultural conditions.
Agron., Agr. Engin. 329
- Fla. Corn Breeding. To (1) breed improved corn hybrids, with emphasis on higher yields, better standability, and more insect & disease resistance; & (2) study comparative efficiency of different breeding methods.
Agron. 374
- Fla. The Effect of Cu, Mn, Zn, B, S and Mg on the Growth of Grain Crops, Forage Crops, Pastures and Tobacco. To determine the effect of: (1) a liberal, uniform, basic treatment of N,P,K, Mg and the sulfate ion superimposed by lime and aeration, singly and in combinations; (2) a light basic treatment of the minor elements and other treatments varied to Mg or S.
Agron. 440

- Ga. Effect of Various Rotations on Yield of Crops. To compare yield of annual crops in a 3-year rotation of cotton, crimson clover, corn, small grain, and soybeans, following 3 years of Coastal Bermuda grass & crimson clover, 3 years of soybeans & crimson clover, 3 years of alfalfa, & 3 years of annual crops.
Agron. 2-1
- Ga. Cereal Breeding. To determine lines of wheat, oats, barley, rye and corn that are high yielding, disease resistant, and adapted to the State.
Agron. 11, coop. USDA & Ga. Power Co.
- Ga. Supplementary Grazing Crops, Winter and Summer, for North Georgia. To determine (1) plants furnishing greatest amount of high nutrient green weight under adverse summer droughts and winter cold and (2) the limiting factors in production of a more nearly year-round grazing program.
Ga. Mt. Sta. 16, coop. USDA, TVA
- Ga. Influence of Certain Plant Nutrients on Yield and Quality of Corn. To determine the influence of newer forms of phosphates in varying quantities and in combination with lime and other plant nutrients on the yield and quality of corn in the Tennessee Valley watershed area of the mountainous section of North Georgia.
Agron. 17, coop. TVA
- Ga. Corn Breeding. To develop high yielding white and yellow corn hybrids and varieties well adapted to various soil and climatic conditions of Georgia.
Agron. 23, coop. USDA
- Ga. Physical Properties of Georgia Soils as Related to Cropping Practices and Yields. To determine effects of different cropping practices, particularly clean cultivated row crops versus pasture or forage crops on the physical properties of soils, including structure, water-holding capacity, infiltration, aeration, volume weight, specific gravity, organic matter, and any other properties which may be considered important.
Agron. 30, coop. USDA
- Ga. Small Grain Breeding. To develop and evaluate (1) superior, disease-resistant varieties of oats suitable for grain and forage; and (2) high-yielding, disease-resistant varieties of rye for winter grazing.
Agron. 36, coop. USDA

Ga. Georgia Grain Marketing Problems. To (1) describe & evaluate present methods of handling, distributing & using grains in Georgia; (2) evaluate grain prices in relation to prices in other areas, types of use, grade & quality, & seasons of year; (3) determine extent of quality deterioration by types of storage, & geographic areas as affected by methods of harvesting & management; (4) relate quality deterioration under different storage types to cost of storage & normal seasonal variations in price; & (5) evaluate present methods of storage & marketing in terms of probable alternatives as determined by results of this investigation.

Agr. Econ., Agr. Engin., Agron. 37 (SM-11)

Ga. Mechanized Farming. To develop a crop rotation system of cotton, corn, small grain, soybeans, legumes, and truck crops that will utilize more efficiently farm machinery and labor throughout the year, to determine the adaptability of machinery now available and new machinery as introduced, and to study the cost and labor requirement for the production of field and vegetable crops with machinery.

Agr. Engin., Agron. 41

Ga. Evaluating Small Grains for Resistance to Major Diseases. To screen varieties and breeding strains developed by Regional S-13 Cooperators in Georgia and other states for resistance to viruses of oats, crown rust of oats, leaf rust of wheat and powdery mildew of wheat.

Agron., Pl. Path. 42 (S-13), coop. USDA

Ga. The Effect of Varying Soil-Management and Cropping Practices upon the Fertilizer Requirements of Small Grains. To determine (1) most profitable rates & ratios of fertilizer for small grains on different soils, following continuous cropping, & in rotation with legumes; (2) effects of disease on yield of small grain under continuous cropping system; & (3) yield interaction between varieties & fertilizer.

Agron. 45

Ga. Rates of Nitrogen Fertilization for Corn with Different Levels of Plant Populations with and without Irrigation. To learn effect of ample supply of water on the inter-relationship between N & plant population on corn grown under different environmental conditions & their effects on yield & nutritive value.

Agron. 46

- Ga. Analysis of the Supply, Price, and Utilization of the Principal Crop, and Livestock Products in Georgia. To analyze economic significance of major changes in quantity, value, and use of principal agricultural products of the state.
Agr. Econ. 71
- Ga. The Introduction, Testing, Multiplication, and Preservation of New and Useful Plants of Potential Value for Industrial and Other Uses. To (1) cooperate with USDA, Southern Region, and P.R. to obtain plant materials of potential value for industrial and other uses and as a source of new germ plasm for use in plant improvement, and (2) establish primary regional plant introduction station to catalog, multiply and preserve introduced and domestic seed and plant materials, and distribute them in the region.
Hort., Anim. Indus., Bot., Agron. 74-(S-9), coop. USDA
- Ga. Variety Testing, Breeding, and Culture of Grain Sorghums in Georgia. To (1) determine adaptation of existing varieties & strains, (2) breed varieties for high yielding ability, disease resistance, quality, & other agronomic characters & investigate feasibility of developing grain sorghum hybrids for commercial production, (3) learn proper planting date for grain sorghums, (4) learn proper row spacing & seeding rate, (5) learn most economical fertilizer practice, (6) learn varietal types best suited for combining & effect combining has on grain moisture content, & (7) evaluate insect-damage & devise control means.
Agron. 85
- Ga. An Evaluation of the Practical and Economical Aspects of Sod-Corn Rotations in North Georgia. To learn (1) if an economical & practical rotation superior to continuous corn can be developed in mountain area, (2) value of rotation on soil productivity & fertilizer utilization, (3) uptake of N, P & K in forage as influenced by fertilizer & duration of sod, (4) fertilizer treatment needed to maintain or increase soil productivity & to correlate crop yields & N, P & K uptake by forage, with chemical soil tests.
Soils, Fert., Field Crops 86
- Ga. Use of Annual Winter Pasture for Fattening Steers in the Coastal Plain of Georgia. Study value of annual winter pastures in steer fattening program when grazed alone & when supplemented with limited amounts of various carbohydrates & roughages.
Anim. Indus., Agron. 108, coop. USDA

Ga. Soil Physical and Chemical Studies as Related to Supplemental Irrigation of Field Crops. Obtain data on soils of Coastal Plain area of Georgia useful for determining most efficient & economical supplemental irrigation practices for crops.

Soils, Agr. Engin., Agron. 112, coop. USDA

Idaho Wheat Breeding for Disease Resistance and Quality. To (1) systematically add rust and smut resistance to those wheats widely grown in Idaho which are not being improved by neighboring states; (2) incorporate a shorter, stronger straw into our better wheats; and (3) conduct preliminary investigations in the inheritance of several genetic unknowns in wheat, particularly quality.

Agron., Pl. Path. 9, coop. USDA

Idaho Testing and Evaluating Agronomic and Horticultural Crops for Idaho Agriculture. To (1) maintain contact with regional primary station at Pullman, Washington, with respect to available plant materials which might be of value to Idaho agriculture; (2) secure promising material of above nature for evaluation under Idaho conditions; (3) evaluate materials for specific purposes & under conditions of a divergent nature peculiar to Idaho; (4) report any findings from tests to Regional Primary Station at Pullman; (5) coordinate important findings with breeding & testing programs extant in Idaho; & (6) develop new crops which might be found under this program.

Hort., Agron., Pl. Path. 21

Idaho Sulfur Studies on Crops in North Idaho Using Radio-active Sulfur. To (1) compare availability of sulfur to alfalfa, wheat and peat from 2 main sources, elemental sulfur and gypsum; (2) determine extent of sulfur uptake by those crops at various stages of growth; (3) determine distribution of sulfur; (4) determine effect of sulfur treatments on crop yields; (5) test "A" value concept for sulfur in those crops; and (6) carry over into the second year using alfalfa and peas as crops.

Agr. Chem., Agron. 28

Idaho Biology, Ecology and Control of Insects Affecting Dry-Land Cereals. To (1) survey dryland grain growing areas to determine insect species present, their abundance & economic importance; (2) make detailed studies on life histories of those found to be major pests; (3) make detailed studies on ecologies of major pests to find how ecological factors influence their abundance & degree of economic damage; & (4) develop practical control measures for all major economic species.

Ent. 33

- Ill. Economics of Grain Storage. To analyze the economics of grain storage in order to make the storage facilities more effectively serve the needs of farmers, marketing agents, and consumers as well as to improve efficiency of the present and potential storage facilities. Also to (1) evaluate economic considerations influencing capacity, type, and location of grain storage facilities; (2) determine economics of quality changes which occur under different methods and periods of storage; (3) analyze storage costs and factors influencing them under various alternative storage conditions; and (4) analyze and evaluate public grain warehouse legislation and administration in various states.
Agr. Econ. 05-355 (NCM-10)
- Ill. The Formula Feed Industry as a Market for Illinois Grains and Grain and Soybean Products. To (1) appraise the importance, current and future, of formula feed industry as an outlet for Illinois grains and grain products, particularly soybean meal; and (2) describe utilization pattern of soybean meal produced and consumed in Illinois.
Agr. Econ. 05-356
- Ill. Improvement of Power, Machinery, and Labor Efficiency,
b. Improvement of Efficiency and Safety of Corn Harvesting Machinery. To (1) find improved methods of harvesting corn & (2) establish design principles for harvesting equipment which will reduce corn losses & accident hazard.
Agr. Engin. 10-332
- Ill. Removing and Metering Small Grains and Supplements from Bulk Farm Storage. To develop methods and design equipment for removing small grains and supplements from bulk storage at variable but controlled rates for combining in feeds.
Agr. Engin. 10-351 (NC-23), coop. USDA
- Ill. A Study of the Chemistry of Zinc and Molybdenum in Soils and Requirements of Crop Plants for These Nutrients. To (1) determine chemical forms of zinc and molybdenum in Illinois soils; (2) determine forms of zinc and molybdenum in soils that are available to plants and minimum levels needed for normal plant growth; (3) correlate amount of zinc and molybdenum in soil with amounts found in plants grown thereon; & (4) determine equilibrium reactions between native soil forms and added zinc and molybdenum.
Agron. 15-360

- III. The Effect of Cropping Systems and Cultural Practices on the Physical Properties of Soils. To (1) determine effects of different rotations, crops, systems of fertilization & inherent soil properties on such soil physical properties as aggregate stability, bulk density, permeability, moisture retention, & susceptibility to compaction; (2) study relation between amount & kind of organic matter in soil & physical properties listed above; & (3) determine rates of change of several soil physical properties under different soil & cultural conditions.
Agron. 15-365
- III. The Relation of Hormones, Ascorbic Acid, Ascorbic Acid Oxidase, and Other Compounds in the Development of Functional Ear Shoots of Corn. To (1) determine cytological and biochemical processes involved in the development of ear shoots of corn; (2) determine effects of pollination of subsequent biochemical and cytological changes of ear shoots of corn; & (3) investigate nature of growth regulating substances involved in ear and kernel development in corn.
Agron. 15-370
- III. The Occurrence and Activity of Glycolytic Enzymes in Corn. To (1) determine if glycolytic enzyme system can be detected in corn seeds & seedlings using methods which have been shown adequate with other plants; (2) determine presence & degree of activity of glycolytic enzyme system in various inbred lines & hybrids of corn; & (3) isolate & characterize specific enzymes such as aldolase & triose phosphate dehydrogenase which play key roles in this metabolic system.
Agron. 15-371
- III. Soil Moisture as a Factor in the Growth and Yield of Corn. To (1) obtain quantitative information on relation between different levels of soil moisture deficiency & growth & physiologic behavior of corn at different growth stages; (2) determine efficiency of water use by corn at different levels of soil moisture deficiency under fertility conditions & plant populations conducive to high yields; & (3) relate water use by corn to open-pan evaporation & other climatic characteristics.
Agron. 15-373
- III. Morphological Studies of Certain Agronomic Crops. To study (1) morphological development of corn, wheat, oats, soybeans, etc. & describe initiation & development of primordia of parts of plant; (2) cycle of development of above in different seasons & under different growing conditions, learn when different stages of development of plant occur & duration of each stage; (3) morphological characteristics of above in relation to corn & stem rust, strength of stalk or stem, & other agronomic characteristics; (4) developmental morphology of certain aberrant types of corn, wheat, oats, soybeans, etc.
Agron., Pl. Physiol. 15-374

- III. Relation of Light, Nutrients, and Carbon Dioxide to the Metabolism of Corn Plant and to its Yield of Stover and Grain. To learn (1) relation of light to composition & to yield of stover & grain per plant of corn at different rates of planting, (2) relation of CO₂ content of air to composition & to yield of stover & grain per plant of corn at different rates of planting, (3) metabolism of corn plant & its response to different light, CO₂, & nutrient conditions.
Agron., Pl. Physiol. 15-377
- III. Inheritance of Economic Characters in Corn. To study (1) & develop research methods applicable to inheritance of economic characters in corn; (2) inheritance of characters that are direct components of grain yield; (3) inheritance of other characters of corn affecting yield or quality of crops; (4) effects of certain environmental factors on characters under investigation.
Agron. 15-379
- III. The Assembly, Evaluation, Seed Increase and Distribution of New Introductions and Genetic and Chromosomal Tester Stocks in Maize. To establish a North Central maize genetics research center to assist maize geneticists & breeders of the region, including screening new introductions for genetic value, preserving existing adapted stocks, propagating tester stocks, & exchanging information & genetic materials among workers.
Agron. 15-382 (NC-7), coop. USDA
- III. Beef Cattle for Increasing Income from Non-Corn Acreage in Corn Belt Crop Rotations. To (1) study value of oats, harvested as silage, for wintering beef calves or for fattening yearling steers; (2) determine appropriate supplements to be fed with oat silage in the two programs mentioned under (1); (3) plan a calf and steer management program which will make best use of the oat and legume-grass seeding in the rotation; (4) study feasibility of extending the legume-grass seeding by using fresh-cut forage method of feeding instead of feeding on pasture; and (5) determine whether a program of finished steers on pasture or on fresh-cut forage adversely affects the carcass value as determined by carcass studies.
Anim. Sci. 20-349
- III. The Nutritive Value of Grains Grown upon Rich and Poor Soils. To complete analyses of samples now on hand, statistical analyses of data accumulated over past several years & publication of the results.
Anim. Husb. 20-355

- Ill. Silage Crops for Dairy Cattle. To compare southern varieties of corn with those in this section and prolific with nonprolific types of corn for silage, seeking a type which will combine large yields of dry matter per acre with good keeping qualities and feeding value as silage.
Dairy Sci., Agron., 35-309
- Ill. Drying and Curing Problems of Seed Sweet Corn and Popcorn. To determine factors causing injury to sweet corn seed during artificial drying & to work out methods of artificially curing popcorn for market.
Hort. 65-340
- Ind. Determination of Drying Rates of Grains in Bulk Air Drying Systems. To (1) determine heat requirements for vaporization of grain moisture; (2) determine maximum drying rates as limited by characteristics of grain (exposed drying rates); and (3) develop methods to predict rates of drying of successive layers in a bulk of grain as influenced by system variables.
Agr. Engin. 273
- Ind. Breeding of Disease and Hessian Fly Resistant Soft Winter Wheat. To (1) originate soft wheat varieties resistant to the diseases, leaf rust, stem rust, loose smut, bunt, mosaic, and powdery mildew and to hessian fly; (2) originate disease resistant soft wheats in an attempt to provide better legume companion crops and possibly better adapted and higher yielding types.
Bot., Pl. Path. 369, coop. USDA
- Ind. Breeding of Winter Barley for Indiana Resistant to Leaf Rust, Powdery Mildew and Loose and Covered Smut, and Hessian Fly. To breed winter barleys, adapted to Indiana, resistant to leaf rust, loose & covered smuts, powdery mildew, & Hessian fly.
Pl. Path., Agron., Bot., 446, coop. USDA
- Ind. Causes of Imperfections in Local Indiana Grain Markets. To (1) determine variations in the relation between grain prices at terminal markets and at various local points in Ind.; (2) determine different local market conditions which explain variations found above; and (3) formulate possible corrective measures to attain more perfect local markets.
Agr. Econ., RM:c 70IES 251
- Ind. Decomposition of Plant Materials and Formation of Soil Organic Matter. To determine (1) changes in decomposition of plant materials, & in microbial populations, caused by variation of nutrients & other factors, e.g., moisture, plant growth; & (2) effect of temperature on decomposition of organic materials & the variation in organic matter formed under controlled conditions.
Agron., Bot., Pl. Path., 707

- Ind. The Relation of Drying and Storage Practices to the Deterioration of Grain. To determine (1) relation of ventilation rate & weather to deterioration of grain during drying; (2) effect of moisture content & conditioning methods used on deterioration of ear corn in storage; & (3) effectiveness of & needs for low volume ventilation to prevent damage to stored grain & related products.
Agr. Engin., Agron., Biochem. 742, coop. USDA
- Ind. Economics in Grain Storage. To determine (1) over-all grain storage needs at terminal level in terms of capacity, market location, investment requirements, & other similar criteria, & evaluate these needs in relation to existing facilities, (2) over-all grain storage needs at country elevator level - same as in (1), & (3) effect of vertical & horizontal integration at both terminal & country elevator levels on cost & efficiency of grain storage.
Agri. Econ. 794 (NCM-10)
- Ind. A Study of Root Absorption of Fertilizers by Plants. To learn relationships that exist between nutrient uptake by corn from localized applications of fertilizers & the plant's environment.
Agron., Hort. 797
- Ind. Oat Breeding, Genetics and Pathology. (1) Develop & evaluate new varieties of spring & winter oats superior in yielding ability, standing ability, quality, & winter hardness & resistance to crown rust, stem rust, loose & covered smuts, Helminthosporium blights, red leaf, & Septoria black stem diseases; (2) Learn nature of inheritance of morphological & physiological characters & of disease resistance to extent necessary to carry out a breeding program effectively; (3) Learn economic importance, epidemiology, & physiologic specialization of causal organisms of diseases attacking oats; (4) evaluate resistance of various types from different sources in relation to diseases concerned.
Bot., Pl. Path., Agron. 819, coop. USDA
- Ind. Genetics and Cytogenetics of Present and Potential Crop Plants. (1) Establish mode of inheritance & interaction of characters in crop plants for which genetic explanation has not been established; (2) Introduce species not studied & establish range of heredity variation in relation to their adaptation; (3) Induce new mutations by ultra-violet light, X-ray, radioactive isotopes, colchicine, mustard gas, hydroxyquinoline, & by biologic mutagens as Ds-Ac system in corn; (4) Evaluate agents for mutagenic activity thru analysis of mutations produced.
Agron. 831

Iowa

Patterns, Costs and Economic Efficiency of the Transportation of Iowa Cash Grain with Emphasis on Truck Movement. To (1) determine comparative costs of alternative means of transporting Iowa cash grains & soybeans in view of production patterns, marketing & processing facilities, & seasonal & geographical price patterns; (2) evaluate factors in increasing importance of truck movement of grains, with view to projecting amplitude & geographical structure of this trend; & (3) determine probable optimum course of action for firms marketing Iowa grains in order to maximize efficiency & efficiency of Iowa grain marketing system as a whole.

Agr. Econ., Rural Sociol., RM:c 70LES 221

Iowa

Seed Treatments for the Control of Seed-Borne and Soil-Inhabiting Pathogens. To determine (1) limitation of organic chemicals for certain disease fungi, (2) value of different chemicals in relation to application methods, dosage, duration of storage, etc., (3) relative effect of soil temperature, moisture, and types on effectiveness of seed treatments, (4) need for seed treatments on different varieties and lines of agronomic crops, and (5) effect of seed treatment chemicals on enzyme systems affecting growth and sporulation of fungi.

Bot., Pl. Path. 858

Iowa

Factors Influencing Seed Production in Certain Grasses and Legumes. To determine (1) the time and condition of induction of floral organs; (2) carbohydrate-nitrogen relationships in the storage organs altered by fertilization and clipping; (3) influence of time and rate of fertilization, clipping treatments, method of planting and other cultural practices upon seed yields of different species; (4) influence of various insecticides upon control of harmful insects in seed fields of red clover and alfalfa; (5) the influence of such control measures upon various varieties, and upon the physiological function of plants.

Agron., Ent., Bot., 1001, coop. USDA

Iowa

The Introduction, Testing, Multiplication, and Preservation of New and Useful Plants of Potential Value for Industrial and Agricultural Uses. To (1) cooperate with BPISAE & other interested agencies of USDA with the state Agricultural Experiment Stations in the North Central Region in a coordinated program of plant exploration & introduction to obtain plant materials of potential value for industrial & agricultural uses, & as sources of new germ plasm for use in plant improvement; (2) maintain regional primary plant introduction station to catalog, multiply, evaluate, & preserve introduced & domestic seed & plant materials & to distribute seed & material to states wishing to study their value & ecological adaptation; (3) maintain & periodically publish an inventory of seed & plants grown at Primary Station & by secondary stations of the region; (4) prepare Breeders Stocks Inventory of field & horticultural plants of economic value to states of North Central Region & assist the states in preserving, maintaining, & distributing these stocks; & (5) establish regional accession record system & publish information on performance of new introductions & domestic accessions as reported by research workers.

Bot., Agron., Zool., Ent., Hort., For. 1018 (NC-7), coop.
USDA

Iowa

The Development of Improved Corn Hybrids. To (1) produce superior inbred lines of corn for different sections of Iowa & the Corn Belt; (2) evaluate lines for combining ability, resistance to or tolerance of major corn insects, resistance to important plant pathogens, & nutritional & industrial characteristics; (3) compare breeding procedures as to relative efficiency in obtaining desired characteristics to the maximum; (4) use existing data & new data to find most efficient procedures for conducting trials for yield or other desirable agronomic characters; & (5) conduct needed basic studies to facilitate attainment of above objectives.

Agron., Bot., Pl. Path., Chem., Ent. 1140, coop. USDA

Iowa

The Development and Increase of Superior Disease Resistant Varieties of Oats. To study (1) development of new varieties of oats superior to present varieties by hybridization and selection; (2) agronomic value, disease resistance and adaptation in different parts of the State of outstanding selections and varieties; and (3) increase in selections definitely superior to those already available for distribution to farmers.

Agron. 1176, coop. USDA

Iowa

The Development and Increase of Superior, Disease Resistant Varieties of Barley, Wheat and Flax. To (1) direct hybridization and selection work toward developing varieties of barley, wheat, and flax best suited to maximum production in certain areas of the state; (2) test and evaluate new hybrids in early generations at northern and western outlying stations, selecting for high yield, stiffness of straw, mid-season maturity, satisfactory grain quality and resistance to diseases most likely to limit yields; (3) to obtain additional and more critical information on value of bulk and pedigree methods of breeding barley, as work to date gives some conflicting information; (4) investigate effects of newer types of drying equipment on malting quality of dried barley; (5) test new accessions of barley in the field to locate disease resistant germ plasm; (6) cooperate with Farm Crops in observing new germ plasm derived from breeding program for susceptibility & resistance to disease; (7) determine importance of diseases in wheat production in Iowa, especially spread of wheat mosaic; (8) develop new & more simple techniques for producing disease epiphytotics necessary for locating disease-resistant germ plasm in barley, especially, with respect to scab.

Farm Crops, Bot., Pl. Path. 1177

Iowa

Cytogenetic Investigations on Cereals. To (1) obtain understanding of relationships between chromosomes of wheat and rye; (2) uncover new and usable genes in common wheat, which now has few genes useful in common genetic procedures; (3) develop new methods of producing amphidiploids in hybrids involving wheat and its relatives; (4) apply techniques already developed for wheat to other cereals; and (5) investigate cytology of Mingo and Clinton oats to determine whether ineradicable variability has a cytological basis.

Genet. 1181

Iowa

The Effect of Time of Planting, Weather Conditions and Character of Plant Growth on Corn Borer Populations. To (1) study differences in resistance or susceptibility between widely different strains of field corn planted at widely different dates & for both generations of borer; (2) study effect of planting date on both first & second generation borer accumulation; & (3) measure damage done per borer, by first & second generation borers, & by total borers, under different infestation levels, & for different strains of field corn.

Ent. 1193 (NC-20), coop. USDA

Iowa

Analysis of Methods, Practices, and Costs of Storage and Marketing of Feed Grains and Soybeans, and the Processed Products of These Crops. To (1) determine relative economics of various methods and types of grain storage under alternative conditions; (2) determine most economic use for the several types and qualities of feed grains and their products; and (3) evaluate effectiveness of present grain marketing methods, facilities, and over-all structure in Iowa in view of current and anticipated trends.

Econ. & Sociol. 1224 (NCM-10), coop. USDA

Iowa

Corn Price and Income Policy. To (1) analyze objectives of the corn price and acreage control program; (2) examine methods used to attain objectives; (3) determine effects of corn price and acreage control program on acreage, yield, and production of corn and other feed crops and livestock, storage stocks of corn and other feed crops, and prices of corn and other feed crops, and livestock; (4) compare effects of program with objectives of the program; and (5) estimate effect of various proposed alternative programs.

Agron., Agr. Econ. 1241 (NCM-11)

Iowa

Radioisotopes as a Tool in Mode of Action Studies of Modern Insecticides Used Against the European Corn Borer and Other Agricultural Pests. To (1) determine metabolism of radioactive DDT, alone and combined with synergists, in European corn borer, in house fly, and other resistant and non-resistant strains of insects; and (2) study action, residues, and metabolism of radioactive systemic insecticides in European corn borer, corn plants, the house fly, and the rat.

Zool., Ent. 1256 (NC-19)

Iowa

Entomological Problems Involved in Corn and Other Field Grain Storage. To (1) test insecticides against corn and feed-grain pests under conditions of temperature, humidity, and other factors prevailing in practical storage; (2) discover more effective and cheaper fumigants and easier and safer methods of using them; (3) study effect of size, shape, construction, and ventilation of storage structures on dynamics of populations of stored grain pests; and (4) study inter-relations between insect infestation in stored grain, heat and moisture production, and prevalence of and spoilage caused by fungi.

Zool., Ent. 1257

Iowa Corn Endosperm Carbohydrates. To (1) identify & characterize enzymes involved in corn sugar-polysaccharide synthesis & metabolism, (2) ascertain distribution of enzymes in different endosperm fractions, (3) explore influence of genetic constitution on enzymes which are present or their distribution or on other factors which might influence polysaccharide metabolism.

Pl. Physiol., Agron. 1283

Iowa Handling Grain Through Harvest, Drying and Storage. To (1) evaluate comparatively on basis of capital requirements, operating costs & labor methods of handling grain from harvest through drying & storage; (2) develop & test a palletized system of handling grain from harvest through drying & to storage in relation to those methods now available; (3) develop, test & evaluate other new methods of handling grain which may become apparent during these studies; (4) examine design of grain drying installations in relation to harvesting machine capacities & performances.

Agr. Engin. Econ. 1295, coop USDA

Iowa Farm Storage and Conditioning of Grains. To (1) learn if mechanical ventilation will control moisture migration & insect infestation in farm stored grains, minimum bin size in which mechanical ventilation is beneficial, & which methods & equipment for mechanical ventilation will produce desired results most effectively; (2) learn pressures exerted by bin walls, floors, structural members & parts (as ducts), by stored grain; (3) learn if heated or unheated air is more effective in drying grains. Study includes design of drying compartments & duct systems in bins, distribution of air in drying grain, selection of grain quality to drying process, & relation of cost to process & equipment; (4) coordinate drying equipment & drying methods with production, harvesting, & handling equipment & methods.

Agr. Engin., Agron. 1296

Kans. Soil Fertility. To study effects of various cropping systems and management practices on crop yield and soil productivity.

Agron. 17 (NC-17)

Kans. The Influence of Environment on the Varietal Quality of Hard Red Winter Wheat. To determine the influence of environment, including meteorological and agronomic variables on the quality characteristics of a number of varieties of hard red winter wheat.

Agron., Milling Indus. 60

Kans. Small Grain and Sorghum Breeding. To (1) improve wheat, oats, winter barley and sorghum by breeding superior varieties which may be released to commercial growers; (2) determine by comparative test with standard varieties the value of new strains developed by this and other projects of the Kansas station or by workers in other regions; (3) provide small lots of seed of desirable varieties for further trial by other workers in larger-than-nursery plots; and (4) study inheritance of economic important characters in these crop plants and devise and test new methods of breeding.

Agron. 67, coop. USDA

Kans. Crop Production. Variety tests of wheat, oats, barley, flax and sorghum at Manhattan.

Agron. 129

Kans. Marketing of Grain and Purchasing of Feeds. To study (1) marketing of Kansas grain and purchasing of feeds; and (2) price movements and method of price determination of these commodities.

Agr. Econ. 143

Kans. The Temperature Relations of Crop Plants. To study varieties of crops and segregates of hybrids for resistance to low and high temperature; (2) influence of environmental conditions on degree of resistance to extremes of temperature; (3) fundamental basis of resistance to high temperature; and (4) relation of varying degrees of relative humidity to high temperature resistance of plants.

Agron. 157

Kans. The Resistance of Crop Plants to Insect Injury. To (1) incorporate resistance to one or more insects into agronomically desirable, high yielding new strains of crop plants; (2) study causes of resistance and number and manner of inheritance of genes for resistance; and (3) study effect of resistant varieties on population levels of insects involved.

Ent., Agron. 164, coop. USDA

Kans. Influence of Legumes on Crop Production and Nitrogen Balance in Soils. To determine amount of N fixed by legumes and by free fixation and to study problems incident to legume production, namely, renewal of stand, optimum soil reaction, moisture conditions of soil following legumes, and effect of legumes upon succeeding crops.

Agron. 172

- Kans. The Inheritance of Factors Affecting Quality of Wheat.
To study mode of inheritance of factors affecting protein quality in certain wheat crosses & to eliminate selections having undesirable quality characters early in plant breeding program.
Milling Indus., Agron. 178, coop. USDA
- Kans. Physiological Studies on Crop Plants. To (1) determine role of wheat awn, particularly its relation to yield, test weight, and kernel weight; (2) study physiological factors influencing development of chorosis in sorghums; and (3) develop or adapt chemical tests for tissue viability in wheat plants subjected to temperature extremes; also comparable test for protoplasmic differences which may exist between drought resistant and susceptible lines of wheat.
Bot. & Pl. Path. 189, coop. USDA
- Kans. Factors which Influence the Colloidal Properties of Dough. To clarify the colloidal behavior of wheat flour doughs and to determine the influence of (1) the constitution of the gluten protein, and (2) the factors in the gluten environment which modify its properties.
Milling Indus. 200
- Kans. Breeding Disease Resistant Wheat, Oats, and Sorghums.
To produce disease resistant varieties of cereals having desirable agronomic characters, and to study inheritance of disease resistance in cereals, in relation to inheritance of botanical and agronomic characters.
Agron., Bot. 207, coop. USDA
- Kans. The Industrial Utilization of Sorghum Grains and Other Crops. To obtain fundamental information on the most economical process of extraction of carbohydrates, oil, and protein fractions of sorghum grains and other crops together with their possible commercial use.
Chem. 208
- Kans. The Influence of Some Factors Affecting the Bio-Chemical and Physical Properties of Wheat. To investigate the physical and biochemical properties of wheat in the late pre-harvest harvest, & post harvest periods.
Milling Indus. 216
- Kans. Laboratory Studies on Quality Evaluation and Improvement of Kansas Wheat. To provide a research and evaluation service for Kansas wheat quality improvement and to investigate, originate, and apply new techniques for cereal product evaluation.
Milling 220

- Kans. Fundamental Nutrition Studies of Sorghum Roughages and Grains.--II, A Study of the Digestibility of Sorghum Silage. To determine the coefficients of digestibility of sorghum silage when fed alone and in conjunction with a high-protein concentrate.
Anim. Husb., Chem. 222-2
- Kans. The Influence of Temperature Extremes and Accompanying Water Relations on the Physiology of the Wheat Plant, Its Organs, and Tissues. To investigate specific influence of low and high temperatures and accompanying water relations on basic physiological activities of winter wheat plant, its organs, and tissues, with the ultimate goal to determine specific changes which occur at these various levels of organization as result of temperature extremes.
Bot. 250, coop. USDA
- Kans. Organization of the Market for Wheat. To analyze (1) structure of wheat marketing systems to establish criteria to assist in marketing of wheat as required by changing techniques of production and consumer demand; and (2) impact of recent advances and developments of technology of wheat production to determine related adjustments needed in marketing system to provide efficient movement of wheat from producers to consumers.
Agr. Econ., Milling Indus. ES 270, RM:c 703
- Kans. Organization of the Market for Feed Grains and Feedstuffs. To (1) establish criteria to assist in marketing of feed grains & feedstuffs as required by changing techniques of production, very rapidly shifting areas of use & changing market outlets; & (2) determine related adjustments needed in marketing livestock feed & feed grains.
Agr. Econ. ES 271, RM:c 703
- Kans. Hessian Fly and Other Insects Attacking the Growing Wheat Plant Above Ground. To (1) study insect infestation & abundance of wheat fields in relation to climatic conditions & farm practices. (2) Collect & identify the insects, & study life histories of insects, affecting the living wheat plant above ground. (3) Measure injury done & where necessary work out control measures for each species.
Ent. 283, coop. USDA
- Kans. The Corn Earworm and Other Insects. To (1) study infestation of corn earworm and other insects as to abundance in fields as related to climatic conditions and farm practices, (2) determine life history and habits of injurious insects in corn fields, and (3) study control measures, cultural and insecticidal, for various pests.
Ent. 284

Kans. The Structure and Physical Character of the Wheat Kernel in Relation to Variety and Milling Quality. To relate finer anatomical structures of wheat kernel, particularly the bran portions, to variety, varietal milling quality, chemical composition and water.

Milling Indus. 290

Kans. Insects Affecting Stored Grain and Milled Grain Products. To (1) study biology & behavior of grain & milled grain products insects, (2) develop methods for distinguishing insect fragments in milled grain products, (3) determine effects, of new insecticides on grain infesting insects, & (4) study insect problems in farm stored grain.

Ent. 322

Kans. Investigations of Mosaic and Other Virus Diseases of Hard Red Winter Wheat. To (1) discover additional means of virus transmission and spread; (2) find additional sources or reservoirs which harbor the virus; (3) discover more cultural practices which will aid in control; (4) find resistant parental stock for breeding; (5) obtain varieties of hard red winter wheat more resistant than those now grown; and (6) conduct basic research on the virus.

Bot., Pl. Path. 334, coop. USDA

Kans. Cytogenetic Studies of Wheat and Related Species and Genera. To study (1) cytogenetics of wheat with emphasis on hard red winter wheat; (2) chromosome stability, normality, or irregularities of wheats used as parents in Kansas wheat breeding program; (3) relation of cytologic condition to inheritance of genetic characters; (4) cytology and genetics of species and genera related to wheat and of interspecific and intergeneric hybrids.

Bot., Pl. Path. 350

Kans. Development of Micro Milling and Baking Equipment. To develop methods for the evaluation of wheat quality using no more than 150 grams of wheat, and to develop appropriate micro milling, baking and analytical techniques

Milling Indus. 354

Kans. Genetic and Applied Cytogenetic Investigations of Farm Crops. To (1) study mode of inheritance of important characters in farm crops to facilitate breeding and selection work in such crops; (2) study chromosomal numbers and behavior in various crop plants and their polyploid, interspecific, or intergeneric hybrid derivatives; and aid in isolation of meiotically stable segregates with desired chromosome numbers; and (3) investigate use of ionizing and related radiations and chemicals for production of favorable mutations and/or polyploids in crop plants.

Agron. 373, coop. USDA

- Kans. Economics of Grain Storage. To improve the efficiency of present and potential grain storage facilities, specifically, to evaluate conditions influencing size, type and location; determine economics of shrinkage and quality deterioration; and analyze storage costs and factors influencing them under various alternative conditions.
Agr. Econ. 384, (NCM-10), coop. USDA
- Kans. Biology and Control of Insects Affecting Sorghums. Learn behavior, type & extent of injury, & control of insects attacking sorghum.
Ent. 432
- Kans. Wheat Price and Income Policy. To (1) analyze objectives & methods used in past & existing wheat programs; (2) estimate money costs of programs to consumers & taxpayers; (3) describe past programs for wheat; (4) learn effects of past wheat programs on: farm income, both size & stability; wheat prices, level, seasonal fluctuations, relation to other farm prices; volume & location of wheat production; domestic use & export use; use of agricultural resources, including size & organization of firms & technological advances; resource prices, especially wheat land; marketing agencies & processors; community organization; (5) use data to predict nature of changes that could result from alternative wheat programs.
Agron., Milling 439 (NCM-11)
- Kans. Factors Influencing European Corn Borer Populations. To (1) measure annual populations & observe changes in population in Kansas as compared to other north-central states, (2) learn presence or absence of synchronization of changes in population; & study influence of weather conditions, biotic-controlling factors & soil management on borer populations.
Ent., Agron. 440 (NC-20)
- Ky. Life History and Control of the European Corn Borer (*Pyrausta Nubilalis*) with Special Reference to Field Corn. To (1) determine habits of corn borer under Ky. conditions, number of generations a year, relative damage to field corn on different dates and comparative resistance of new and old inbred, single cross, and double cross corns to attack; (2) aid in control by distributing borer parasites and making parasite surveys, (3) find out extent of spread and abundance of corn borer, and (4) find out what other hosts are attacked besides corn.
Ent., Bot. 16
- Ky. An Economic Study of Nitrogen and Potassium Fertilization of Corn. To determine (1) most profitable rate of N application with K held constant at various levels; (2) most profitable rate of K application with N held constant at different levels; (3) least cost nutrient (N & K) combination for yields at different levels; & (4) economics of residual effects of above fertilizer applications on succeeding corn crops.
Agron., Agr. Econ. 21

- Ky. Economic Adjustments in Kentucky Agriculture. To (1) outline, prior to July 1, 1952, a long-time program of research in coop. with T. V. A. dealing with the following points: (a) to provide farmers with basis for economic adjustment of individual enterprises on farms to industrialization and to increased availability of fertilizers, electricity, etc.; (b) provide farmers with basis for economic overall adjustment of farms as above; (c) provide leaders of local organizations with basis for economic adjustment of areas as above; (d) determine effectiveness of alternative educational or promotional techniques used in giving information to farmers; and (e) analyze influence of T. V. A. development and general economic progress and activities of other government agencies on capital accumulation; (2) analyze farm records kept in connection with T.V.A. demonstration farms so as to estimate dollar productivity of expenditures for machinery, stock, etc.; (3) determine adjustments which can be made by part-time farmers in T.V.A. counties and assistance which can be given by Ext. Serv; and (4) initiate test demonstrations of fertilizers which will give data for finding optimum rate of fertilizing one or more principal crops of Kentucky.
Agr. Econ. 32, coop. T.V.A.

- Ky. The Biology and Control of Mites and Armyworms Attacking Cereal and Forage Crops. To (1) determine mite species involved in various crops and evaluate economic importance; (2) study relationship of various mite population with reference to insecticide(s) used; (3) study influence of mite predators or other biological control factors on population; (4) evaluate acaracides and make recommendations on control; (5) study causes of armyworm outbreaks and possibilities for predicting infestations; (6) study control methods and evaluate insecticides for effective control; and (7) make residue studies of treated crops.
Ent., Agron. 60 (S-25)

- Ky. Corn Breeding. To produce better inbred lines of corn and better hybrids for use in Kentucky than now grown.
Agron. 155

- Ky. A Study of Plant Pathogenic Nematodes and Their Effects on Crop Plants in Kentucky. To (1) determine how much and in what way nematodes are a factor in crop production; (2) identify species of nematodes concerned; (3) adapt and develop methods of handling nematodes in experimental studies; (4) determine intercrop relations of nematode diseases; (5) adapt and develop methods of controlling nematode diseases.
Agron. 159 (S-19)

- Ky. The Structure and Other Physical Properties of Kentucky Soils as Affected by Cropping and Soil Management Practices. To (1) determine permeability of soil profiles from representative soil types in Kentucky, (2) relate permeability of soils to other physical soil properties, and (3) study effect of cropping and other soil management practices on physical properties of soils.
Agron. 165
- Ky. Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants and Plant Species for Industrial and Other Purposes, and for the Preservation of Valuable Germplasm of Economic Plants. To (1) introduce species & varieties of plants into Kentucky which are considered to have possible agricultural value; (2) multiply & evaluate introduced plants as new crops, as sources of new germplasm in crop improvement, & for possible new uses; (3) evaluate any native plants which may have potential value to Kentucky agriculture; & (4) preserve varieties & species of economic plants which have valuable germplasm.
Agron., Hort. 166 (S-9)
- Ky. The Nature of Resistance and Susceptibility of Oats to Crown and Stem Rust. To determine differential growth requirements of rusts which lead to specie and racial specialization.
Agron. 169
- Ky. Biology and Control of Soil Insects Attacking Corn and Studies of the Effects of Soil Insecticides on Corn. To (1) determine relative harmful effects of soil insect pests of corn; (2) study relationships of crop rotations or cultural practices with soil-insect populations; (3) evaluate control measures; (4) study effects of insecticide-fertilizer combinations on the corn plant; and (5) study effect of insecticides on development of the plant.
Ent., Agron. 453
- Ia. Corn Breeding. To conduct a broad and comprehensive corn breeding program with following objectives: (1) Developing new and better inbred lines for use in producing superior hybrids, (2) Testing inbred lines, (3) Determining best methods in obtaining maximum seed production from inbred lines, (4) Increase foundation seed stocks of inbred lines, (5) Testing single-cross hybrids, (6) Testing double-cross hybrids and (7) Determine most efficient methods of obtaining maximum yields of hybrid corn.
Crops, Soil 131, coop. USDA

- La. Root and Stem Diseases of Rice. To study disease organisms affecting roots & stems of rice which are influenced materially by physiological and environmental factors, including such diseases as root rot, seedling blights, white tip, stem rot, straight head, & Rhizoctonia sheath spotting.
Pl. Path. 388
- La. Leaf Spot Diseases of Rice. (1) Survey and studies to determine causal organisms: (a) work out life histories, host ranges, extent of variation, (b) inoculation work to determine susceptibility of rice varieties, mode of infection, influencing environmental factors, (c) inoculation tests on developing grains, (d) study of roots of "white tip" plants, (3) develop control through selection or breeding for resistance, seed treatment, destruction of wild hosts, sanitation, etc.
Pl. Path. 389
- La. Investigation of Chemical Compounds as Insecticides, and Chemical Compounds and Materials as Extenders and Adjuvants for Use in Insecticides. To compound and test chemical formulations as insecticides and study materials and chemicals as diluents and adjuvants for use in insecticides, thus developing more satisfactory and economical preparations with which to combat crop pests.
Ent. 406
- La. Rice, Small Grain and Grass Seed Harvesting, Handling and Drying. To (1) determine most economical & efficient methods of harvesting, (2) determine cause & remedy for checking & breaking of grains, & (3) develop low cost farm storage & driers.
Agr. Engin. 501
- La. Soil-Borne Diseases of Forage and Cereal Crops in Louisiana. To determine factors, both pathological and physiological, influencing growth of oats, lespedeza, vetch, alfalfa, winter peas, etc.
Pl. Path. 559

- La. The Microorganisms and Mechanisms Involved in the Gains and Losses of Nitrogen in Soils of the Lower Mississippi Flood Plain and Terraces and the Relation of the Cropping Systems to the Changes in Nitrogen and Nitrogen Accumulations. To study (1) in the field, relation of various cropping practices to supply of N & influence of cropping practices on accumulation or depletion rate of N & organic matter content of soils & losses of N by leaching; (2) influence of various cropping practices on numbers of non-symbiotic N-fixing bacteria & value of these microorganisms in adding N to soil; (3) isolate from soils microorganisms capable of living on N-free medium & at different oxygen tensions & to study their N-fixing capacity in pure & mixed cultures; (4) study in greenhouse effects of artificial inoculation of seed, lime, phosphorus, & potassium on symbiotic N fixation, nodule formation & protein content of certain legumes grown in soils of the lower Mississippi flood plain & terraces; & (5) study in the lab the mechanisms involved in gains & losses of N in these soils.

Soils 596

- La. Nematodes Associated with Root Diseases of Crop Plants. To (1) determine species or races of nematodes which cause root diseases of crop plants in Louisiana; and (2) determine role of nematodes in development of certain root diseases attributed to fungal agents.

Pl. Path. 665

- La. Stored Grain Insects with Special Emphasis on Those Infesting Rice, Especially the Rice Weevil. To perfect effective, practical & economical control measures suitable for storage conditions and requirements in La., embracing; (1) biology of rice weevil and other species; (2) ecological factors affecting species as pests; (3) seasonal habits; (4) varietal resistance; (5) control.

Ent. 827, coop. USDA

- La. Cytogenetic Research in Rice. (1) Learn if partial sterility which occurs in hybrids between indica & japonica forms of cultivated rice, Oryza sativa, is caused by structural differences in chromosomes. (2) Study nature of any chromosome structural differences found in indica x japonica hybrids & learn effects of structural differences on sterility. (3) Study chromosome relationships between cultivated rice, Oryza sativa, & other species of genus Oryza. (4) Try to get more data on origin of cultivated rice.

Agron. 893, coop. USDA

- Maine The European Corn Borer and Other Insects Affecting Corn. (1) To obtain information on the European corn borer, the fall armyworm, & the corn earworm; & (2) to develop means for more effective control.

Ent. 5

Maine. Effect of Soil Residues of DDT and Toxaphene on Plant Growth. To determine possible toxic effects to potatoes from continued application to soil and to plants of DDT and toxaphene, especially possible effects on flavor or other quality factors, accumulation and persistence of residues in soil, and detection of residues in soil.

Ent., Chem., Agron 8, coop. USDA

Maine Soil Management Practices and Equipment Suitable for Conservation Farming in Maine. To (1) determine relative value of various soil management practices for soil and water conservation on Class II and III land and to improve most suitable practices; (2) adapt and develop farm equipment for improved and economical conservation and land management; (3) study effectiveness of various methods of plowing and seed-bed preparation and effect of fall vs. spring plowing; (4) determine effect of various soil management practices on physical characteristics of soil; and (5) determine runoff rates from principal potato soils under various conditions of slope and cover.

Agron. 9, coop. USDA

Maine Chemical Weed Control in Maine Crops. To devise methods for the utilization of chemical herbicides for the control of weeds not readily controlled by ordinary cultural practices.

Agron., Hort. 14

Maine Small Grain Breeding and Variety Testing. To (1) develop by hybridization and selection improved varieties of small grains which will be high yielding, disease resistant, and agronomically desirable for the area; and (2) determine which of available varieties and new strains of oats, wheat, and barley are most suited from standpoint of yield, maturity, and other characters for growing in Maine.

Agron. 32, coop. USDA

Maine Use of Lime on Agronomic Crops Grown in Maine. To (1) determine response to lime by various crops; (2) evaluate, chemically, availability of plant nutrients at varying pH levels; (3) test efficiency of various liming materials as to ability to change pH of a soil; and (4) compare various methods and times of application.

Agron. 43

Maine

Breeding Spring Oats for Higher Yields. (1) Develop higher yielding varieties & strains of spring oats. (2) Investigate techniques for evaluation of a small grain for yield in early generations following hybridization. (3) Obtain information on inheritance of yield in oats.

Agron., Pl. Path. 58 (ME-23)

Maine

Fertilizer and Cultural Trials for Small Grains and the Establishment of Forage Seedings. To determine (1) best fertilizer applications, row spacings & seeding rates for oats, barley, & wheat; (2) effects of these treatments on survival, growth & yield of clover, or legume-grass mixtures which follow small grain in rotation; & (3) effect of date of planting upon yield, quality & amount of injury from diseases in small grain varieties.

Agron. 63

Md.

Spontaneous and Induced Multiple Seedlings and Haploids of Zea Mays, Capsicum Frutescens and Other Economic Plants and Their Use in Plant Breeding. To (1) determine the frequencies and types in regard to number of members and chromosome numbers of spontaneous multiple seedlings and compare with the frequencies and types of multiple seedlings induced by X-rays or other agents; (2) determine by means of genetically marked stocks and direct microscopical examination, the origin of spontaneous and induced multiple seedlings and compare differences or similarities in the modes of development of spontaneous and induced polyembryony; (3) establish degree of genetic control of spontaneous polyembryony; (4) ascertain the frequency of haploids among induced multiple seedlings and compare with the frequency of haploids among naturally occurring multiple seedlings; (5) utilize haploids in the development of superior new varieties by doubling the chromosome number of the haploids, first to be carried out in the garden pepper and later extended to other plants; and (6) evaluate resulting homozygous lines in field performance.

Bot. F-15b

Id.

Business Analysis of Southern Maryland Tobacco Farms. To determine (1) organization, income and labor efficiency on tobacco farms where tobacco sale is practically the entire source of income; (2) organization, income and labor efficiency on Southern Md. tobacco farms where a balanced crop and livestock program gives several sources of income; (3) farm management data including case histories of successful farmers as basis for developing more complete management program for one crop tobacco farms; (4) extent and practicality of increasing income of tobacco farms by adopting more balanced program; and (5) influence of production practices on quality of tobacco and other factors influencing organization and operation of entire farm.

Agron., Anim. Husb., Tobacco Improvement Foundation,
A - 18 - ai

Id.

Farm Labor Requirements. To (1) ascertain labor needs in production of livestock, field crops, truck crops, and vegetables both for fresh market & processing; (2) determine changes in mechanization of production of the commodities and their effect on labor requirements; (3) determine sources and supply of farm labor; and (4) determine what farmers have done specifically to alleviate effect of labor shortage

Agr. Econ., A-18-ai

Id.

Biology and Control of the European Corn Borer. To (1) determine incidence, distribution and effectiveness of parasites that have been colonized against the borer, particularly *Lydella* and *Macrocentrus*; (2) gather data on seasonal abundance of first generation borers with the intent to correlate this information with climatology of several typical areas, the growth of corn, and abundance; & (3) study seasonal abundance to determine number of generations in several widely separated areas.

Ent. H-43

Id.

Breeding for Better Dent Corn. To (1) continue effort to correct deficiencies in hybrid corn by replacement with new hybrids, or by modifying hybrids now in use, (2) concentrate more favorable genes in the germ plasm of useful inbreds by intercrossing, backcrossing, & selection, (3) evaluate inbreds & their hybrid progenies with regard to general productivity, disease resistance, stalk strength, retention of ears after maturity, tolerance to drought, response to rate of planting, & other characters of agronomic importance.

Agron. B-50, coop. USDA

- Id. Effects of Soil Physical Factors on Crop Production. To (1) study effect of various cropping systems on physical properties & organic matter content of soil, (2) study relationship between soil physical factors & crop production, (3) compare productivity of soils under cropping systems which vary in field crops grown, type of interseeded cover, & incorporation of crop residues, (4) provide plots of same soil type, location, & fertilizer applications which differ in soil physical properties; (5) study effect of soil aggregating material on soil physical properties & crop production.
Agron., Soils O-53 (NE-11)
- Id. Wheat Improvement for Maryland. To (1) discover or originate better varieties of wheat for Maryland; (2) evaluate more accurately the adaptation of improved varieties to several wheat areas; (3) evaluate varieties for use of high soil fertility levels; (4) evaluate varieties for tolerance to 2,4-D & other chemicals for weed control; & (5) study trend of performance of old varieties and composite populations from year to year.
Agron. B-66, coop. USDA
- Id. Improvement of Small Grains for Feed. To (1) discover or originate better varieties of winter barley, winter oats, and spring oats for use in Maryland; (2) evaluate more accurately value of these feed grains in several crop regions; and (3) study varieties as to disease resistance, stiffness of straw, yield, maturity period, and other agronomic characters.
Agron. B-67, coop. USDA
- Id. Breeding for Mildew Resistance in Winter Barley and Wheat. To (1) contribute to the study of genetics of resistance to powdery mildew, *Erysiphe graminis hordei*, (2) devise or improve methods for creating artificial epidemics of the disease useful in evaluating breeding material and in estimating damage from the disease, & (3) breed superior varieties of winter barley & winter wheat having a high degree of mildew resistance.
Agron. B-69, (NE-23), coop. USDA

Md. Engineering, Soil, and Plant Aspects of Supplemental Irrigation. To determine (1) N retention in soil & its availability to plants as related to various irrigation & fertilizer practices, (2) interrelationships of crop species, rooting habit & certain cultural practices to yield & quality of agronomic crops as influenced by irrigation, (3) effects of irrigation on yield & quality of selected vegetable crops of importance in Maryland & the region, (4) interrelationships of supplemental irrigation, fertilizer & other cultural practices in their effects on yield, quality & mineral nutrient content of vegetable crops, (5) rate of use of soil moisture by vegetable crops at various stages of growth & under varying climatic conditions, & (6) effects of frequency of irrigation, amount of water, starting time of irrigation & distribution methods with specific reference to first 5 objectives.
Hort., Agron., Engin., BOQR-83 (NE-22)

Md. Marketing Wheat, Corn, and Soybeans in Maryland. To determine and make available basic information on nature and extent of market organizations and facilities for marketing wheat, corn, and soybeans in Md., and initiate new or superior facilities and practices.
Agr. Econ., RM:c-703 A-26-ai

Mass. The Evaluation and Use of Flint Lines in Flint-Dent Hybrids. To develop and improve early maturing hybrid field corn with wide adaptation to the higher plateau regions of the State.
Agron. 3, coop. USDA

Mass. Effects of Supplemental Irrigation on Various Soils and Crops. To learn (1) rates & frequencies of irrigation as they are related to various soil types & various crops, (2) effective root zones of various field, vegetable, & forage crops; & relate findings to irrigation recommendations, (3) soil compaction as related to irrigation & yields of various crops.
Agron., Agr. Engin. 12 (NE-22)

Mass. The Influence of a Chelate and Chelated Iron on the Availability of Iron to Plants in the Presence of Unavailable Iron. To ascertain effectiveness of certain chelates that carry iron in preventing iron chlorosis of plants grown in a nutrient solution, compared with use of iron derived from ferric phosphate, and to learn if sodium salt of EDTA will chelate the iron of the phosphate fraction & then release it for use by plants.
Bot. 21

- Mass. The Formation and Source of Nitrites in Nutrient Solutions. To learn what combinations of nutrient chemicals facilitate the formation of nitrites in nutrient solutions.
Bot. 22
- Mass. Agricultural Economic Analysis of the Organization & Operation of Conn. Valley Cash Crop Farms. To determine prevailing production patterns of Conn. Valley Cash Crop Farms in order: to (1) investigate & evaluate ways of saving labor and reducing costs, (2) evaluate impact of improved production practices, & (3) analyze these adjustments in enterprise structure and operations in terms of net farm income.
Agr. Econ., Agron. 44
- Mich. Frost Control on Vegetation by Convected Heat, Infra-Red Radiation, and Air Movement. To (1) investigate all possibilities of generating infra-red which would be adaptable to frost control, and develop methods and equipment entailing lowest manufacturing costs, using liquid fuels, and using LP gas; and (2) investigate possibility of using helicopter rotor as a method of bringing warm upper air down on the crop, with added heat.
Agr. Engin. 6-A
- Mich. The Use of Several Tillage Methods for the Preparation of Seed Beds for General Agricultural Crops. To determine the effect of various methods of seed bed preparation on yield and quality of corn, beans, oats, and beets, and the physical properties of the soil, and time, power, and labor requirements.
Soil Sci. 7
- Mich. A Study of Soil Conditions as Influenced by Crop Rotation, Tillage Methods and Plant Nutrient Supply on the Yield and Quality of Sugar Beets and Beans. To investigate: (1) influence of crop sequence and tillage practices on soil porosity and aggregates, (2) best plant nutrient ratio for different soil types, (3) most profitable rate of fertilizer application, (4) need for minor elements as indicated by growth characteristics and yield, (5) need for additional nitrogen as related to cropping system, etc., (6) effect of plowing under of green manures compared with perennial sods on the physical condition of soil and crop yields, (7) use of segmented or whole seed in cropping systems, and (8) value of different tillage implements in preparing suitable seedbed.
Soils 23

Mich.

Breeding of Better Oat Varieties Adapted to Michigan Agricultural Conditions. To develop oat varieties which possess: greater yielding capacity; resistance to crown rust, stem rust, smut, and Septoria diseases; straw stiff enough to be suitable for combine harvesting; heavy weight per bushel; and improved inherent nutritional qualities as measured by vitamin and amino acid content.

Agron. 50

Mich.

Insect Vectors of Crop Plant Diseases. To (1) determine insect vectors of aster yellows on potatoes, lettuce, carrots, gladiolus, etc.; (2) study bionomics of species concerned; including life history, migration, food plants, ecology, and control; (3) study mechanics of disease transmission by species under study; (4) make inoculation experiments with various virus diseases, using accurately determined species or races of insects; and (5) by mass transfers of infected insects to non-infected plants of the same and of different species.

Ent., Bot., Pl. Path., Hort. 78

Mich.

Corn Breeding, Improvement, and Genetics. To (1) develop improved corn hybrids for Michigan; (2) conduct fundamental research in corn genetics, breeding methods & physiology; (3) evaluate corn cultural practices, particularly as affecting new corn hybrids; (4) develop improved methods of hybrid seed corn production; & (5) evaluate commercial hybrids for their adaptation to Michigan soil & climate.

Farm Crops, Chem., Soils, Bot. 115, coop. USDA

Mich.

Relationship of Soil Nutrient Balance on Quality as Indicated by Composition of Crops Grown on Organic Soils. To determine (1) varietal interaction of crops to plant nutrient requirements, (2) interaction of protein and amino acid content of crops to soil nutrient levels; (3) effect of soil nutrient levels on cation and anion constancy, and vitamin content of crops; and (4) relationship of soil tests to crop composition.

Soils Sci. Agr. Chem. 119

Mich.

The Secondary Effects from Soil Application of Pesticides. To (1) cooperate with work on Regional Project NC-19, led by Wisconsin Station; & (2) accumulate information on hazards associated with use of pesticides under Michigan conditions, particularly those on soil.

Agron. 451 (NC-19)

- Mich. Water Requirements of Crops. To determine (1) use of water by crops, as influenced by climate, soils & farming practices; (2) basic relationships between soil moisture & crop production; (3) optimum growth conditions for crops including field corn, potatoes, forage; tomatoes, & strawberries, under various irrigation, fertilizer & management practices; & (4) proper irrigation equipment design principles & operational practices as affected by peak moisture use, crop rooting habits, fertilizer practices & other design factors.
Agr. Engin., Hort., Farm Crops, Soils Sci. 805
- Mich. Frozen Starch-Thickened Sauces. To find a flour starch or modified starch suitable for use in frozen starch-thickened sauces.
Foods, Nutr. 809
- Minn. Economics of Grain Storage. To (1) learn overall storage needs at terminal & country levels & evaluate existing facilities in terms of these needs, (2) evaluate existing storage capacity, handling facilities, & storage volume in relation to market location & merchandising functions of various grain merchandisers & processors, (3) learn what integration & trends toward consolidation exist among grain merchandising & processing firms & the operational advantages & disadvantages with respect to bulk grain storage of such integration.
Agr. Econ. 1122 (NCM-10), coop. USDA
- Minn. Economics of Grain Marketing. To analyze: (1) supply, demand, & price relationships of grains that are of importance to producers, merchandisers, & processors in Minn.; & (2) pricing policies, costs, & margins of grain marketing firms.
Econ. 1125
- Minn. A Study of the Properties of High Moisture Ensilage that Influence the Design of Silos and a Study of Methods for Reducing Moisture Content of Ensilage Crops by Mechanically Expressing the Moisture from the Green Material. To determine the quantity of moisture drainage from silos, its rate of flow & its chemical composition.
Agr. Engin. 1203

- Minn. Weed Control with Particular relation to Field Crops. To improve methods of weed control now in use by investigation of potential methods with chemicals, cropping practices, and mechanical means, and to study techniques in field and lab for weed control investigations.
Agron. & Pl. Genet. 1301, coop. USDA
- Minn. Varietal Improvement in Barley. To obtain improved varieties of barley for Minnesota.
Pl. Genet., Agron. 1304
- Minn. Cytology in Relation to Genetics. To (1) determine why certain species as wheat and others show low sterility and directed segregation, while some show higher sterility and non-directed segregation to correlate genetic and cytological behavior, (2) produce cytogenetic tools for study of these problems using mutagenic agents; (3) determine behavior as ring size is increased in corn, eventually to synthesize a pure stock, (4) determine cytogenetic basis for sterility in crop plants, and (5) build up knowledge of genetic linkage maps and locate new genes.
Agron., Pl. Genet. 1309
- Minn. Corn Improvement. To study (1) production of improved hybrids for the various maturity zones in the State; (2) relative value of various methods of breeding; & (3) methods of field plat technic & improved practices.
Pl. Genet., Agron. 1311
- Minn. Genetics of Barley. To determine the mode of inheritance of characters in barley, and to determine the linkage relations of these characters.
Agron. 1312
- Minn. Cytogenetics of Crop Plants. The application of certain cytological technics and special stocks will be studied with particular reference to the following problems: (1) To determine the number and location of the genes for disease reaction and other characteristics in wheat by the use of monosomics and nullisomics, and to study their use as one method of transferring desirable characters from one variety to another; (2) to use chromosomal stability as one criterion of selection in obtaining true breeding varieties in wheat and oats, and (3) to study behavior in selected clones of brome grass in relation to combining ability in polycrosses and utilization in hybrids and synthetic varieties.
Agron. 1320

Minn. Cropping Systems Based on Grassland Crops. To (1) determine how much of increased yield of corn which follows legume-grass sod is due to N contributed by the legume & how much by the sod per se; (2) determine how long beneficial effects of sod last after it is plowed; & (3) evaluate new concepts of crop management such as growing green manures between widely spaced corn rows as compared with conventional systems.
Agron. Pl. Genet., Soils 1321

Minn. The Biochemistry of Milling, Baking, and Macaroni Manufacture.--I, Milling.--II, Baking and Macaroni Manufacture.--III, Wheat and Flour Constituents in Relation to Biochemical Properties of Cereal Foods.--IV, Dough Ingredients Other Than Wheat Products. To determine (1) fundamental principles involved in the conversion of wheat and typical wheat products into "bread stuffs", (2) quantity and nature of various wheat and flour constituents and their effect upon processing requirements; (3) function of typical ingredients of the formulas followed in manufacturing such foods.
Biochem. 1503, coop. USDA, USQMC

Minn. A Study of Factors Influencing the Keeping Quality and Processing Value of Grain.--I. Biochemical and Microbiological Factors Involved in the Respiration, Storage Behavior and Industrial Value of Grains and Their Mill Products. 2. Effects of Methods of Drying Grain on its Processing Value. To (1) determine significance of moisture, temperature, microflora, etc. on industrial value, respiration, heating and spoilage of grains and their mill products; (2) investigate underlying factors in deterioration of grain and its products in storage; (3) study methods to minimize deterioration in storage; & (4) establish conditions under which grains may be artificially dried with minimum deleterious influence on viability & processing values.
Agr. Biochem. 1504

Minn. Storage of Grain in Various Atmospheres in Sealed Bins. To learn effects of various atmospheres on the microbiological, entomological, & biochemical factors that influence the quality of stored grains, especially wheat, corn & soybeans.
Agr. Biochem. 1517

Minn.

The Toxicity to European Corn Borer of Insecticides and an Interpretation of their Penetration and Accumulation in Insect Cuticle. To (1) explain differences in insecticidal efficiency when applied at different temperatures, (2) explain certain insecticide concentration-temperature relationships by comparing ease of adsorption, (3) compare insecticidal efficiency on European corn borer, particularly with materials less hazardous than DDT, and (4) compare efficiency of different insecticidal forms and application methods for European corn borer.

Ent. & Econ. Zool., 1722, coop. USDA

Minn.

Causes of Insect Outbreaks.--I. Factors Affecting Populations of European Corn Borer. To (1) make an annual census of borer abundance together with measurements of major factors of weather and biotic factors which affect borer abundance; (2) carry out experimental work aimed at elucidating operation of weather, biotic, agronomic, and soil factors on borer abundance; and (3) study effect of plant characteristics such as development, genetic make-up and physiologic conditions on the level of abundance of borers in the corn plant.

Ent., Zool., Agron., Pl. Genet., Soils 1726,
(NC-20), coop. USDA

Minn.

Effect of the Association of Molds and Insects on the Keeping Quality of Stored Grain. To learn if the development of insects within stored grain bulks is associated with, or contributes to, growth of storage molds that are known to lead to heating & other spoilage of stored grains.

Ent. 1730

Minn.

Rusts of Cereals.--8. Physiologic Specialization in Cereal Rusts. To determine (1) number, distribution, pathogenic capabilities, and population shifts of physiologic races of Puccinia graminis, and other important cereal rusts, and (2) how often new physiologic races arise and their pathogenicity for cereal varieties.

Pl. Path., Bot. 2209-8

Minn.

Rusts of Cereals.--9. Epidemiology of Cereal Rusts. To (1) determine the conditions under which inoculum of cereal rusts, particularly Puccinia graminis, is carried from north to south and south to north by the wind; and (2) obtain further information regarding long-distance spread of stem rust from barberry and crown rust from buckthorn, method by which Puccinia graminis survives under different winter conditions, and factors affecting the development of epidemics of stem rust.

Pl. Path. & Bot. 2209-9

Minn. The Nature and Variability of Plant Disease Resistance.--I, Wheat and Other Small Grains. To determine (1) whether resistance is due to functional, morphologic, or physiologic characters or various combinations of the three; and (2) to what extent resistance of crop plants varies with stage of development, environmental factors, and biotic factors such as relation between host and pathogene.
Pl. Path. & Bot. 2214, coop. G.S.

Minn. A Study of the Ecology of Mice in Relation to Their Contamination of Grain. To study the life history and ecology of the house mouse, and other varieties of mice which contaminate grain, with a view towards devising satisfactory control methods.
Zool. 2217-M1

Minn. Epidemiology of Leaf Spots and Other Foliage Disease of Crop Plants.--II, Corn and Small Grain Diseases. To determine number, prevalence, and distribution of physiologic races of important pathogens that cause foliage diseases of corn and small grains and also the relative importance of such diseases in breeding disease-resistant varieties.
Pl. Path., Bot., 2219-2

Minn. Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage.--I, Soybeans, Corn and Cereal Grains. To determine (1) mold population of commercial lots of corn, soybeans, and cereal grains of different market quality; (2) main factors influencing growth of molds on storage grains; and their effects; (3) if mold assays might be useful as additions to criterion of quality; and (4) which promising compounds can be used as inhibitors of molds on stored seeds.
Pl. Path. & Bot. 2220-1

Miss. Corn Improvement Through the Use of Inbred Lines. To develop (1) better methods for developing inbred lines that are high in yield as inbreds, high in yield as crosses, resistant to insects, resistant to diseases, and excellent in agronomic characters; (2) single cross hybrids which are excellent seed parents and do not need to be detasseled, and single cross hybrids for use as male parents which restore fertility to sterile female single cross; and (3) double cross hybrids which produce high yields of excellent quality corn, adapted to mechanical farming.
Agron. AC-1

Miss. The Effect of Supplemental Irrigation on Crop Production and Soil Properties in Mississippi. To determine (1) value of supplemental irrigation in terms of economic yield and quality of various crops, (2) optimum rates and frequency of irrigation, (3) most satisfactory and economical methods of applying irrigation water including cost of various methods, (4) effect of irrigation on physical and chemical properties of soils, and (5) effect of supplemental irrigation on incidence of weeds, insects, and diseases.
Agr. Engin. BB-1

Miss. Rye and Wheat Breeding. To (1) test a collection of varieties of wheat and rye for forage type, disease reaction, and winter hardiness and resistance to lodging and determine their value for immediate commercial use, and for use as breeding material; (2) produce by appropriate methods new varieties of winter wheat and winter rye resistant to currently important diseases, of suitable forage type and of good grain quality and yielding ability.
Agron. BC-3

Miss. A Study of Factors Affecting the Establishment of a Standardized System of Grade Designations for Hybrid Seed Corn. To determine (1) maximum amount of variation in width, thickness, & length among kernels that will permit accurate planting with all types of planter plates, (2) maximum amount of variation in kernel width, thickness, & length permissible based upon sales appeal, & (3) if a system of describing & designating grades of hybrid seed corn grown in the southern region can be formulated.
Agr. Econ., Agron. ES 398

- Miss. Farm Mechanization as Related to Hill Section of Mississippi. To (1) study adaptation of various combinations of machines that may be used in mechanical production of corn, cotton and other row crops in hill section; (2) develop and adapt new machines for production of corn, cotton and other row crops; and (3) study effect of date of harvest, plant characteristics, and field conditions on efficiency of row crop harvesters and to adapt or modify those harvesters to increase efficiency.
Agr. Engin. FB-1
- Miss. Mulch Farming Requirements. To study (1) equipment needs and adapt or design equipment satisfactory for producing crops in mulch; (2) crops, spacing and fertilization needs of said crops for economical production by mulch methods; and (3) additional water requirements for crops, if any, due to mulch type farming.
Agr. Engin. FB-4
- Miss. Barley Breeding. To (1) develop new varieties of barley better in all respects than currently available strains, (2) determine where in this state barley can best be grown; and (3) conduct fundamental studies when they are needed.
Agron. FC-1 (S-13)
- Miss. Development of Improved Varieties of Silage Crops. To introduce, isolate by selection, or develop by hybridization and selection, superior varieties of crops for soiling and silage.
Agron. FC-4
- Miss. The Genetic Improvement of Grain Sorghum for Production Under Humid Conditions. To develop superior varieties of grain sorghum adapted to soil & climatic conditions of this state.
Agron. FC-6
- Miss. Small Grain Production as Affected by Fertilizer Rates, Fertilizer Placement and by Stand. To learn efficiency of phosphate for (1 & 2) forage production as affected by banded & broadcast applications, & by ammoniation. Delta Red 88 oats will be used for forage. Victorgrain oats, Anderson wheat, & Kenbar barley to be used. (2) grain production as affected by time & method of application. (3) Learn yield of grain & extent of lodging as affected by conventional row seeding & restricted broadcast seeding at variable rates of seeding & at varying N levels.
Agron., Soils, FD-4

- Miss. A Study of Different Methods of Finishing Steers to be Marketed in Late Summer and Fall. To determine relative value of various methods of finishing steers on feeds available in Miss. as measured by 1. rate of gain and length of feeding period; & 2. net returns per steer.
Anim. Husb. FE-2
- Miss. A Comparison of Methods of Seeding Corn and Soybeans to be Hogged-off with and without a Protein Supplement. To determine relative value of different seeding rates and combinations of corn & soybeans when hogged-off, with & without a protein supplement.
Anim. Husb., FE-4
- Miss. Control of Insects Affecting the Production of Sorgo and Grain Sorghum Seed. To (1) evaluate damage done to heads of sorgo & sorghum by each species of insect in various parts of the state; (2) make seasonal history studies on species of insects, needed to work out controls; (3) note relative rate of infestation of various species on variation varieties & selections of sorgo & sorghum in efforts to find plant material resistant to insects; (4) study effect of agronomic practices which may lead to growing sorghums with least insect injury to heads; & (5) conduct toxicological studies to work out practical control of insects after using best cultural methods.
Zool., Ent., FH-6
- Miss. Production of Disease Resistant and Cold Resistant Varieties of Oats Adaptable to Mississippi. To (1) develop varieties of oats resistant to major diseases of Miss., & having enough cold resistance to supply adequate grazing thru the winter; & (2) evaluate selected varieties & strains for grain yields, resistance to old & new diseases, & to cold injury, at several Branch Stations in the state.
Pl. Path. & Physiol., FL-1, coop. USDA
- Miss. Cause of Spikelet Drop in Oats. To investigate nature of certain new and destructive diseases of small grains in Mississippi with particular emphasis on "Spikelet Drop of Oats."
Pl. Path & Physiol. FL-7
- Miss. Corn Disease Investigations in Relation to Breeding for Resistance. To evaluate existing inbred & hybrid lines for resistance to following: physo-derma brown spot, northern corn leaf blight, common corn smut, southern corn leaf blight, helminthosporium leaf spot & ear rot, seedling blight, & other diseases; and to incorporate resistance to these diseases into inbred lines being developed, and improve old & develop new techniques for rapid & efficient testing of disease resistance.
Pl. Path., Agron. FL-10

Miss. Investigations on Winter Hardiness: Studies on Certain Physiological and Pathological Aspects of Freezing Injuries of Small Grains. Physiological studies: effect of some electrolytes & other diffusable substances on degree of freezing injury. Pathological studies: Predisposition of small grains to action of root parasites following exposures to freezing temperatures.

Pl. Path. & Physiol. FL-12

Miss. Fall Versus Spring Application of Nitrogen for Summer-Growing Crops. Investigate influence of time of application of N on crop response to its use. Learn factors affecting efficiency of N applied at different times.

Soils, Agron., FU-3

Miss. A Study of the Influence of Small Grains as Winter Green Manure Crops on the Growth, Quality, and Yield of Vegetable Crops. (1) Learn value of small grains as winter green manure crops on: yields & quality of vegetables, increasing organic matter, losses of plant food by leaching, occurrence of weeds & non-desirable grasses. (2) Compare results obtained from plots planted to small grain to ones using animal manure, & to bare plots. (3) Learn influence of small grains on amount, kind, & time of application of commercial fertilizers for maximum yields.

Truck Crops FZ-3

Miss. Control of Insect Pests of Stored Corn and Small Grain. To determine (1) necessary modifications of steel and other type bins used in Mississippi for the efficient use of fumigants; (2) rates and frequency of application of fumigants needed in properly prepared bins necessary to avoid being graded as 'weevily'; (3) efficiency of 'grain protectants' for the control of different species of insects on clean grain; (4) effect of foreign matter and moisture content of grain (surface and beneath surface) on the control obtained from use of 'grain protectants' and fumigants; (5) importance of field infestations and possibly of farm management being used to reduce the infestations; (6) value of chemicals other than those tested which have characteristics that suggest a possible means of control of the rice weevil on corn stored in the shuck; and (7) differences in the rate of increase of rice weevil populations in those corn single crosses which have possibilities of being used for the production of hybrid seed.

Zool. & Ent., PH3

Miss.

Studies of the Effects of Herbicides Upon Weeds and Crops. To (1) study physiological action of herbicides upon crops & weeds; (2) determine influence of climatic, biotic, & edaphic factors on action of selected herbicides; (3) determine effects of herbicides on soils & plant successions following their use, & study their movement patterns in soils; (4) evaluate effects of new herbicides upon selected crops & weeds; (5) develop agricultural usages and practical methods of employing herbicides for controlling weeds selectively in crops, grasslands, ponds, orchards, etc.; (6) develop methods of employing herbicides for non-selective control of weeds in non-agricultural areas; & (7) develop, adapt, & evaluate equipment for accomplishing objectives 5 & 6.

Pl. Path., Agr. Engin. PL-4, coop. USDA

Mo.

The Use of Water in the Production of Agricultural Crops. To (1) determine physiological effects of application of water to different species of plants at different stages in their growth; (2) develop reliable criteria for determining when various species will benefit from water; (3) study response of different varieties to particular levels of available soil moisture; (4) determine possibility of lowering rate of transpiration of various crops; (5) determine influence of fertility level on yield & quality of crops grown under various soil moisture levels; (6) determine optimum rate & amount of water application for various soils to be irrigated; (7) determine effect of irrigation on physical & chemical characteristics of various soils; (8) study changes in management practices, such as disease & insect control, made necessary by use of additional water in crop production; (9) determine present sources of water & develop design data for surface reservoirs as source of irrigation water; (10) adapt existing methods & develop better ones for irrigating under humid conditions, (11) integrate use of irrigated pastures into livestock production; & (12) make case studies with farmer cooperators on costs and benefits of irrigation.

Hort., Engin., Econ., Soils, Field Crops, Dairy Husb., Anim. Husb. 1

Mo.

The Use of Water in the Production of Agricultural Crops.
a. Irrigation and Tillage in Corn Production. To determine (1) optimum irrigation procedures to be used in the production of corn with high fertility levels; and (2) type of seedbed preparation that will give greatest return for corn under irrigation.

Agr. Engin. 2-a

- Mo. Mechanism of Heredity in Corn. To determine (1) comparative effects of X-rays & ultraviolet radiation on gene mutation & chromosomal aberration, (2) gene variability, spontaneous mutation & mutational pathways as studied in mutable gene systems, & (3) analysis of gene structure at selected loci.
Field Crops 48, coop. AEC
- Mo. Development of Deeper Soil Root Zones on Claypan Soils by Deep Fertilization, Deep Plowing and Subsoiling.---a. The Effect of Deep Fertilization on Runoff and on Yield of Corn, Wheat and Alfalfa. To determine under field conditions; (1) yield effect of N in subsoil with & without deep placement of other plant nutrients; (2) effect of deep treatment from field sized terraced areas; (3) optimum depth & method of treatment.
Soils, Agr. Engin. 70-a, coop. USDA
- Mo. Breeding Hybrid Corn for Missouri. To (1) develop agronomically superior hybrids, (2) develop hybrids for special purposes, (3) conduct investigations in pathological, entomological, & cultural problems, & in breeding techniques.
Field Crops 85, coop. USDA
- Mo. To Breed Better Winter Barley for Missouri and to Study the Factors Associated with Production, Winter Hardiness, and Resistance to Diseases and Insects. To (1) breed better varieties adapted to Missouri conditions and to test such for hardiness, (2) discover varieties and selections resistant to disease and insects and superior in agronomic qualities and to evaluate such for use as feed, and (3) analyze the genetics governing the inheritance of characters associated with productivity, winter hardiness, disease and insect resistance.
Field Crops, FH-90, coop. USDA
- Mo. Investigation of the Biology and Control of Field Crop Insects. To (1) make studies of life histories & seasonal abundance of important insect pests of soybeans & learn population levels justifying insecticidal control, (2) apply soil insecticides to land before planting to soybeans, to control soil-infesting insects, (3) make observations on soybean fields, sprayed, to learn effect on insect pests & insect parasites & predators, (4) use experimentally, new insecticides for control of bean leaf beetle, corn earworm, clover leaf worm, etc., (5) study control of legume insects with insecticides, (6) search for corn plasm resistant to Southwestern corn borer, (7) study migration of potato leafhopper & its causes, (8) study breeding field corn for resistance to corn earworm, (9) study uniform National Insecticide Control Test on corn earworm; (10) consider seed treatment with soil insecticides, (11) investigate control of Hessian fly, with insecticides, (12) collect & study parasites of European corn borer, (13) investigate soil insecticides on corn & small grains, & (14) study insecticidal control of grasshoppers.
Ent. 102

- Mo. Farm Enterprise Costs and Returns.--A. Costs and Returns in Producing Corn. To (1) obtain knowledge of physical input-output relationships involved in producing corn; (2) ascertain extent to which basic soil treatments influence these physical relationships; and (3) obtain cost data on various physical inputs and thereby study breakeven point at different levels of fertility.
Agr. Engin. 110-A
- Mo. Experiments in Crop Sequences. To study: (1) continuous cropping vs. crops in sequence of various lengths; (2) effect of soil treatments on various cropping systems; (3) value of different legumes in cropping systems.
Soils 117
- Mo. A Study of the Diseases of the Field Crops of Missouri with Special Attention to Rusts and Smuts of Small Grains; and Leaf Blights and Stalk Rots of Corn. To (1) learn diseases of economic importance & describe new ones, (2) make crop yield loss estimates due to diseases, (3) learn resistance rating of present breeding lines, hybrids & varieties to common diseases, search for resistant types & cooperate with breeders, (4) learn optimum & limiting environmental factors for disease development & search for cultural control, (5) test established & newly developed chemicals & antibiotics for control, (6) study methods of inoculation for inciting epiphytotics & develop new methods for studying diseases of field crops.
Pl. Path., Field Crops 127, coop. USDA
- Mo. Research in the Control of Weeds.--a. Control of Weeds (Including Woody Plants) in Pastures and Meadows, and Control of Weeds in Corn, Cotton, Cereals, Soybeans. To reduce the damages to pastures, corn, cotton, cereals, and soybeans, caused by weeds in their many and varied ill effects.
Field Crops, Agr. Engin., For. 156-a, coop. USDA
- Mo. Rice Production in Missouri.--A. Field Studies of Breeding Material. To survey and study a broad range of varieties for plant features & qualities desired under natural & economic conditions in Missouri, an essential step in breeding new varieties of rice.
Field Crops 173A, coop. USDA

Mo. Economic Problems of Grain Marketing and Grain Storage.
To (1) make detailed compilation & analysis of laws of state governing grain storage, & of practices of bonding companies, insurance companies, & other financing agencies contributing to grain storage in Mo., (2) learn volume, kind, location, & use of existing processor, terminal, sub-terminal, & local grain storage facility in Mo. for purpose of analyzing their adequacy in view of present & future grain marketing patterns & in coordination with similar studies in other states, to contribute to a similar objective of the Mo. Cen. Regional Mktg. Research program, & (3) develop more information to assist operators of country elevators in remodeling, relocating, & rebuilding local market facilities consistent with the trends in marketing techniques.
Agr. Econ.. 179 (NCM-10)

Mo. Improvement of Soft Red Winter Wheat in Missouri.--a.
Breeding and Evaluating New Strains of Soft Wheat with Resistance to Leaf RRst, Loose Smut, and Hessian Fly. To breed an improved strain of soft wheat for Missouri, combining leaf rust, loose smut and Hessian fly resistance in a high yielding strain with good quality, using extensively N fertilizers and working for an early, short, stiff-strawed variety; and comparing any new strains originating from this project with standard varieties to find relative merits, and quality of grain by tests to learn its commercial use.
Field Crops 202-a, coop. USDA

Mo. Breeding Better Oats for Missouri.--a. Breeding and Testing New Strains of Oats for Missouri. To (1) compare best new experimental strains developed in our breeding nurseries, and elsewhere, with standard varieties in search for new varieties, improved in yield, straw qualities, and disease resistance; (2) develop varieties with superior disease resistance, especially to those diseases which are constantly changing as a result of changing physiologic races; and (3) develop varieties with superior resistance to lodging by improving straw strength as well as type of root development.
Field Crops 203-a, coop. USDA

Mo. The Use of Water in the Production of Field Crops. To learn the effect of irrigation on yield & quality of (1) corn grown under different levels of fertilization, (2) cotton grown under different levels of fertilization, (3) soybeans, (4) pastures for beef cattle, & (5) forage crops.
Soils, Anim. Husb., Engin., Ent. 204, coop. USDA

- Mo. Nutritive Value of Foods.--a. Nutrients in Grains, in Forage Crops, and in Rations of Ruminants Before and After Fermentation in an Artificial Rumen by Rumen Microorganisms. To (1) compare nutritional value of newer forages; (2) obtain further data on effect of fertilizer treatments on nutritional properties of plant; (3) study amino acid content of practical rations which support rapid growth of chicks and find what amino acids are deficient in feedstuffs which permit only slow growth of poultry; (3) study improvement of bovine & bovine rations, in vitamin and amino acid content, during fermentation with rumen micro-organisms in an artificial rumen;--i. to study synthesis of essential amino acids in low protein rations containing urea; & ii, to find whether nutritional properties of cottonseed oil meal can be improved by this procedure; and (4) determine percentage of zein protein in crude protein of 55 samples of exotic corn grains secured by Dr. Zuber from the Iowa State College Experiment Station.
Agr. Chem., Field Crops. 212-a
- Mo. Grain Drying. To (1) study operating characteristics of grain drying systems, with emphasis on distribution of air in grain mass; and (2) obtain further data on conditioning of ear corn with unheated air.
Agr. Engin. 225
- Mo. The Cytogenetics of Wheat. To (1) get additional information on fundamental genetics of wheat, (2) locate genes on the chromosomes of wheat, & (3) transfer desirable genes to wheat from other genera.
Field Crops. 261, coop. USDA
- Mo. Soil Fertility and Corn Production. To learn proper use of fertilizer nutrients in connection with other management practices, for most efficient production of corn on various soils of state.
Soils, Fert., Field Crops .268
- Mo. Corn Insects, with Special Emphasis on Spil Insects, The Corn Earworm, the Southwestern Corn Borer and Occasional Pests. (1) study soil insects & arthropods with emphasis on distribution, life cycle, & destructiveness of wireworms, rootworms, cutworms, flea beetles, mites, Collembola & other arthropods, (2) search for corn plasm resistant to Southwestern corn borer, (3) breed field corn for resistance to corn earworm, (4) conduct uniform National Insecticide Control Test on corn earworm, (5) study biology & control of occasional pests of corn that have not been of importance.
Ent., Field Crops 269, coop. USDA

- Mo. The European Corn Borer with Special Emphasis on the Biology, Parasite and Chemical Control and Importance of the Pest in Missouri. To (1) study factors influencing borer population as weather, & biotic controlling factors, & follow annual changes in abundance of borer & compare with other states, (2) collect & study parasites of borer, (3) evaluate insecticide control on early, mid-season & late planted corn, (4) collect data to learn actual reduction in yield of corn in Missouri brought about by typical low infestations of 1st & 2nd generation borers.
Ent., Field Crops. 270, coop. USDA
- Mo. Corn Production in Intensive Rotations with Small Grain. To learn (1) use of corn & compare it with other crops for use in intensive 2-crop, 1-year rotations, (2) methods & ways of improving techniques of quickly preparing seedbeds & planting corn & comparison crops following harvesting of small grain, (3) earliest stages of maturity practical for harvesting of crops which will be followed by other crops in intensive rotations, (4) methods & to improve techniques of early harvesting of corn & comparison crops.
Agr. Engin., Field Crops 272
- Mo. Investigations of the Biology, Ecology and Control of Grasshoppers Injurious to Corn and Related Crops. To study (1) effect of weather, biological factors, cultural practices, chemical control, soil types, soil fertility, etc., on insect population; (2) host plant preferences of economic species of grasshoppers; (3) habitat preferences of important crop-pasture species of grasshoppers; (4) seasonal history & habits of each of economic species of hoppers; (5) chemical control of hoppers in crop-pasture farming to learn proper timing & application of insecticides & to learn feasibility of their use.
Ent. 286
- Mont. Corn Improvement Through Development and Use of Inbred Lines. To produce strains of corn superior to present open-pollinated varieties in yield of grain, yield of fodder, and other desirable characters through the development and subsequent hybridization of inbred lines adapted to Montana conditions.
Agron. 734

Mont.

Biology and Control of the Wheat Stem Sawfly (Cephus Cinctus, Nort.) in Montana. To study the biology and activity of the wheat stem sawfly throughout the season in the infested areas, correlating the biological activity of the insect with the growth and development of the host plant, the influence of the host plants upon sex ratios of the insect, to develop methods of forecasting sawfly infestations, observing under field conditions the resistance of wheat varieties to sawfly attack, and to conduct a laboratory study of nutritional requirements of the sawfly larvae.

Zool. 805

Mont.

The Economics of Grain and Forage Storage. To (1) analyze effects of variability in grain and forage production on farmer's or rancher's ability to meet his operating costs & land charges thru the years & provide a living for his family; (2) determine potentialities & limitations of storage as a means of reducing instability due to variations in yields considering: cost of storage with various kinds of facilities; benefits to be expected from storage; who should provide storage, where & in what amounts; (3) develop recommended storage program, private and/or public, which will be adapted to needs of both growers & users of forage & grain in Montana; & (4) relate storage to other economic devices for reducing instability in farm & ranch income, & to national policy concerning income, employment, international trade & strategic reserves.

Agr. Econ. 883

Mont.

Preliminary Investigation of the Market Structure, Prices, and Price Policies for Wheat with Particular Reference to Montana Wheats. To (1) describe market mechanisms for wheat & their price making roles; & (2) find sources of information & appropriate research techniques for use in a subsequent project, the objectives of which will be: (a) to analyze current & past domestic and foreign demand for wheat especially classes & qualities of wheat produced in Western Region; (b) to analyze current & past domestic & foreign supply conditions for wheat, especially that produced in Western Region; & (c) determine differences in price for & quantity of principal kinds of western wheats that may result from various national wheat price & production policies.

Agr. Econ. 911 (WM-13), coop. USDA

- Mont. Oat Improvement by Breeding, Selection and Testing. To (1) develop thru breeding superior oat varieties with respect to yield, quality, & other desirable agronomic characteristics; (2) test adaptability of new & introduced oat varieties & selections for Mont.; & (3) provide information relative to improvement of cultural practices & production techniques.
Agron. 929, coop. USDA
- Mont. A Description and Analysis of the Market Mechanism for the Movement of Important Feed Grains. To (1) describe movement of feed grains between farms within Montana, Western region, & between Western Region & rest of the U.S.; (2) describe marketing channels thru which movements of feed grains take place & marketing methods involved; (3) analyze functions of marketing mechanism; (4) determine costs & margins, & determine reasonableness of such costs & margins in light of services rendered; & (5) isolate and study weaknesses & problems in order to make recommendations for improving marketing of feed grains.
Agr. Econ. 932 (WM-20)
- Mont. The Improvement of Barley in Montana Through the Development of Superior Varieties and Cultural Practices. To (1) determine adaptation of new & introduced barley varieties & selections, (2) develop, by hybridization & selection, varieties superior to those now grown in Montana, (3) develop & improve cultural methods, (4) develop new uses & expand former uses for barley thru plant breeding, (5) search for basic information for most feasible & economical means of accomplishing these objectives.
Agron. 953, coop. USDA
- Mont. Virus Diseases of Cereals. To (1) establish identity of viruses inciting specific diseases of cereals, (2) study occurrence of various strains & complexes among viruses, (3) establish identity of vectors spreading these diseases in Montana, (4) learn epidemiology & economic importance of diseases, (5) devise practical & economic control.
Bact. & Bot. 975
- Nebr. Determination and Application of the Principles of Corn Improvement. To (1) determine relative merits of various methods of improving inbred lines; (2) study possibilities of increasing efficiency of development of new lines; (3) study genetic principles involved in corn improvement; (4) study comparative merits of more variable corn populations than commonly used double-cross hybrids, particularly in central and western Nebraska; and (5) apply these principles to develop improved strains of corn for Nebraska farmers.
Agron. 11A, coop. USDA

Nebr. Improvement of Spring Small Grains.--Oats, Barley, and Spring Wheat: and Winter Barley. To improve status of spring-sown small grain and winter barley production by (1) discovering in breeding material and among introductions of superior strains of these crops for culture under Nebraska conditions; (2) finding and using strains with superior germ plasma in breeding better adapted varieties having resistance to major hazards of production; (3) investigating quality of crops and varieties with reference to yield & value of products; (4) determining underlying principles concerned in biology of cereal plants; & (5) making small quantities of foundation seed of superior varieties available for further increase & use by citizens of Nebraska.

Agron. 19, coop. USDA

Nebr. Crop Rotations. To determine performance of various standard farm crops grown in rotation with and without sweet-clover, red clover, alfalfa, and soybeans and barnyard manure, Agron. 22

Nebr. Commercial Fertilizers and Manures for Farm Crops in Nebraska. To (1) compare effects of bromegrass, alfalfa, sweet clover, legume-grass mixtures and commercial nitrogen on soil nitrogen maintenance as measured by crop yields, crop composition and soil composition; (2) establish time, method and rate of application of different kinds of nitrogen and phosphorus fertilizers for farm crops; (3) determine influence of residue management and commercial fertilizer applications on production of wheat in western Nebraska; and (4) determine need for lime, potassium, magnesium, sulfur, and minor elements for farm crops.

Agron. 104, coop. USDA

Nebr. Studies of Flour and Baking Quality Factors by Methods Involving Fractionations and Recombinations of Protein, Starch, and Other Flour Components. To determine the extent to which various individual fractions of flour, starch, protein, & other components, respectively, influence flour baking behavior & hence the industrial utility of wheat.

Chem. 129

Nebr. Enzymes of Wheat and Flour and Their Relation to Baking Characteristics. To study (1) methods for identification and estimation of flour enzymes; and (2) their relation to flour properties.

Agr. Chem. 184

Nebr. Wheat Evaluation Studies. To (1) determine comparative merits of commercial and experimental varieties of winter and spring wheat for culture in Nebraska; (2) evaluate in appropriate uniform tests varieties developed in neighboring states as to performance and possible use in Nebraska; (3) evaluate strains for market acceptability; and (4) make limited quantities of foundation seed available for further increase from time to time.

Agron. 213, coop. USDA

Nebr. A Study of the Adaptation, Improvement, and Culture of Grain, Forage and Sugar Sorghums. To (1) determine adaptation, drought resistance, seed qualities, and culture of sorghum; (2) improve existing varieties with regard to desirable characters; (3) study reaction of varieties and selections to environmental conditions conducive to excessive formations of prussic acid; (4) investigate use of 2,4-D and similar chemicals for weed control; (5) determine yield and sugar content of certain sugar varieties; and (6) make genetic and cytogenetic studies and investigate certain physiologic processes of sorghum plant.

Agron. 228, coop. USDA

Nebr. Investigation of the Power, Labor, and Machinery Requirements for the Production of Corn in Nebraska. To get better soil erosion control, better weed control, and better yields by adapting power, labor, and machinery to corn production, utilizing the best agronomic information and regional influencing factors.

Agr. Engin. 281

Nebr. Fundamental Research on Virus Diseases of Plants and Their Control Under Nebraska Conditions. To study factors governing infection, host range, mode of transmission, movement of viruses within host, mutation of viruses and use of less virulent forms to protect crops from disease, and a survey of virus diseases.

Pl. Path. 342

Nebr. A Study of the Effects of Food, Temperature and Related Factors on the Ecology and Physiological Development of Corn Rootworms. To (1) develop a satisfactory technique for mass rearing of several species of corn rootworms in greenhouse under controlled conditions; (2) determine effects of various host plants on development & fecundity of corn rootworms; & (3) develop complete synthetic diet for rootworms.

Ent. 376

Nebr.

The Genetic Effects of Irradiating Crop Seeds with Thermal Neutrons and X-Rays. To determine (1) types and frequencies of chromosomal aberrations in first mitotic divisions in root tips of irradiated seeds; (2) effects of irradiating crop seeds with various dosages of neutrons and X-rays on subsequent seedling development; (3) effects of irradiating seeds on meiotic behavior and on male gametophyte development of irradiated generation; (4) effects of irradiations on seed set in irradiated generation; (5) occurrence of chimeras in irradiated generation; (6) occurrence of transmissible mutations after irradiation; (7) study effects of enriching seeds with various elements having high capture probability for thermal neutrons; and (8) conduct physical-chemical studies that will help to gain understanding of fundamental biological effects of thermal neutrons.

Agron. 410, coop. USDA

Nebr..

Genetics of Agronomic Plants and Soil Microorganisms. To (1) develop principles, techniques and other information helpful in plant breeding and other agronomic work; (2) assist plant breeders in working out fundamental genetic problems arising in regular experimental work; (3) develop genetic information on soil microorganisms; and (4) develop information in fundamental genetics.

Agron. 411, coop. USDA

Nebr.

Transportation and Storage of Nebraska Grain. To (1) analyze methods of grain transportation and storage to find ways to make these facilities more effectively serve needs of farmers, middlemen, and consumers as well as improve efficiency of present and potential storage and transportation facilities; (2) describe present capacity, type, and location of grain storage and transportation and measure efficiency of existing and alternative facilities; (3) analyze effects of quality changes which occur under different methods and periods of storage and transportation; (4) measure and analyze storage and transportation costs, and factors influencing them under various alternative conditions; and (5) evaluate public grain warehouse legislation and administration in Nebraska.

Agron. Agr. Engin. 421 (NCM-10), coop. USDA

Nebr.

Biology, Ecology and Control of the Hessian Fly, *Phytophaga Destructor* (SAY). To (1) make comprehensive study of biology, ecology, and physiology of Hessian fly; (2) develop practical & economical methods to control Hessian fly, & (3) study use of insect-resistant strains of wheat.

Ent., Agron. 443, coop. USDA

Nebr. Nitrogen Status of Nebraska Soils in Relation to Crop Production. To (1) evaluate soil & plant tests for determining N status of Nebraska soils in order to improve recommendations for N fertilizer; (2) determine influence of soil N & application of N fertilizer on composition of grains & forage with emphasis on forms of N in plants.

Agron. 472, coop. USDA

Nebr. Physiologic Studies of Obligate Parasitism, with Special Emphasis on Diseases Caused by Rust. (1) Develop quantitative techniques for; inoculation of obligate parasites, maintenance of host & parasite under controlled conditions, determination of extent of development of parasite. (2) Study specific metabolic systems responsible for obligate nature of parasitism. (3) Determine metabolic changes in host during, & as result of, infection, particularly changes which may be associated with resistance or susceptibility of host. (4) From 2 & 3, effect an inquiry of possibility of effective chemotherapeutic control of obligate parasites of economic importance. (5) Establish quantitative, rapid, & reliable methods for evaluating chemical compounds as possible chemoterapeutants.

Pl. Path., Field Crops, Pl. Physiol. 502

Nebr. Annual Census of European Corn Borer Populations. To study (1) annual changes in abundance of borer in 2 counties for a period of several years. (2) influence of weather conditions, biotic controlling factors, soil management, & irrigation practices on borer populations, (3) presence of, or lack of synchronization of, changes of borer populations in state & other study areas in North Central States.

Ent., Agron. 508, (NC-20), coop. USDA

Nebr. Breeding Hard Red Winter Wheats for Nebraska. (1) Develop superior strains & make available limited quantities of seed for quality evaluation & testing under Project No. 213. (2) Investigate & learn basic principles relative to genetics & physiology of wheat plant.

Agron., Pl. Path. 509, coop. USDA

Nebr. Production, Analysis, and Use of High Quality Seed. To learn (1) effect of moisture content of seed on germination of grain sorghums & methods of reducing moisture as: best time of applying desiccant, moisture content at which sorghum seed can be successfully dried, effect of desiccant on sorghum germination, effect of pre-drying on sorghum germination; (2) by use of continued planter-drill box sampling on kind & quality of seed planted by farmers & organize information since 1951 in publication form. (3) effect of coumarin in sweetclover seed on germination of alfalfa, wheat, & oats in germinator.

Agron. 518

- Nev. The Economics of Marketing Hay and Feed in the West.
To describe and analyze economic phases of transportation
and trading in feed grains and hay in the West.
Agr. Econ. 1 (WM-20)
- Nev. Fertility Status of Nevada Soils, and Their Needs
for Fertilizers or Other Items of Treatment or Management,
for the Improvement of Yields and Quality of Crops. To
obtain information on which to base recommendations on use
of fertilizers, soil amendments, and other items of soil
management, to farmers operating on major soil types in the
farming areas of the state, with a subobjective--to correlate
rapid chemical tests with crop responses to soil treatments.
Soils 66
- N. H. Marketing Mixed Grain Feed. To study efficiency of dis-
tributing mixed grain feed from stores to commercial poultry
and dairy farms.
Agr. Econ. 22
- N. H. Variety Trials of Grain Crops for Forage and Grain
Yields. To test out varieties released by other stations,
commercial companies and cooperative organizations, which
work will lead to closer cooperation with plant improve-
ment groups of Northeastern States.
Agron. 33
- N. J. The Development of a Suitable Electrical Moisture
Meter to Determine the Moisture Content of Forage and Grains
in the Field. To develop (1) suitable electrode to make
numerous successive readings of moisture content on forage
& integrate them into a representative value; & (2) present
grain electrode & calibrate it for the grains, including an
investigation of temperature of calibration.
Agr. Engin. 58 (NE-13)
- N. J. Nematodes and Their Relationship to Other Plant Path-
ogens Causing Food and Forage Crops Diseases. Learn rela-
tionship between plant parasitic nematodes & root rots &
other root-invading fungi of several New Jersey crops;
extent of injury caused by nematodes of different feeding
habits to plant roots; extent to which fungi are primary
parasites; combined effect of nematodes & fungi in producing
root injury; effect of controlling nematodes & fungi in
eliminating root rot & root invasion.
Ent., Pl. Path. 209, Coop. USDA

- N. J. Study of Some Factors Affecting Corn Yield. To (1) develop cultural improvements & techniques to further increase productiveness of hybrids, (2) determine which hybrids have the ability to produce top yields under intense management & (3) check effect of planting pattern on stalk rot incidence as well as other factors.
Agron. 228
- N. J. Breeding and Culture of Winter and Spring Small Grains. To make more efficient by breeding and better cultural practices the growing of both winter and spring small grains in N. J.
Farm Crops 259
- N. J. The Breeding of Varieties of Winter Barley Resistant to Loose Smut. To attempt to develop winter barley varieties that are resistant to the races of smut present in the region.
Farm Crops 261 (NC-23), coop. USDA
- N. J. Studies on Diseases of Field Corn. To learn extent of, & control measures for, root & stalk rot; effect of fertilizers on incidence of these diseases; species of leaf blight in state, source of inoculation, & conditions favoring its spread.
Pl. Path., Agron. 476
- N. J. Ion Relationships in Plants and Soils. Learn effects of Ca/K ratios on yields & composition of tomato fruit, factors affecting canning qualities of tomato fruit, & effects of clay mineral variations in soils as they influence the release of ions to tomato plants.
Soils 628
- N. Mex. The Preliminary Testing and Evaluation of New Foreign and Native Plants of Potential Value for Oil, Protein, and Leguminous Forage. To (1) determine their adaptability, seed and/or forage yields, and other agronomic characteristics; (2) evaluate by chemical analysis seeds and other parts of new plants to determine their value as potential sources of oil, protein, and leguminous forage; and (3) maintain supplies of viable seed of the evaluated plants.
Agron. 19 (W-6)

- N. Mex. The Economics of Marketing Alfalfa Hay and Grain Sorghums in New Mexico. To (1) learn movement of alfalfa hay & feed grains within, out of, & into N.M. & surrounding states, (2) learn marketing & transportation methods used, (3) analyze marketing functions performed & costs & margins incurred, & (4) learn role of feed processors as a demand factor for N.M. alfalfa hay & grain sorghums.
Agr. Econ. 30 (WM-20)
- N. Mex. An Analysis of Crop and Livestock Trends in New Mexico. To determine (1) trends in acreage and production of each crop and numbers of livestock in New Mexico by counties & for the state; and (2) physical and economic factors responsible for changes which have occurred in the state.
Agr. Econ. 35, coop. USDA
- N. Mex. Soil Structure in Relation to Plant Growth and Chemical Properties of Soils. To (1) study relation of exchangeable sodium to physical & chemical properties of soils; (2) determine yield & chemical composition of alfalfa & other crops on sodium soils; (3) study influence of natural & synthetic soil amendments on structure of sodium soils & plant growth; & (4) correlate yield & chemical composition of crops with various indexes of soil structure.
Agron. 44 (W-30)
- N.Y.C. Studies of Heredity in Plants. A, Genetic Studies of Maize. To determine the mode of inheritance of numerous characters of the plants studied.
Pl. Brdg. 2-A
- N.Y.C. Studies of Heredity in Plants. B, Genetic Studies with Wheat, Oats, Barley, Rye, and Buckwheat. To determine the mode of inheritance of numerous characters of the plants studied.
Pl. Brdg. 2-B
- N.Y.C. Studies of Heredity in Plants. D, Analysis of Heredity in Plants in Terms of the Biochemistry and Physiology of Gene Action. To further understand ways in which genes govern metabolism of organisms and to clarify relationships between genetics and adaptation.
Pl. Brdg. 2-D
- N.Y.C. Breeding and Testing Crop Plants, A. Breeding Wheat, Oats, and Barley for Yield, Quality, Winter Hardiness, Disease Resistance, and Stiff Straw. To develop better varieties of important field and vegetable crops. Characters desired are high yield associated with quality of produce, disease resistance and, with some crops, winter hardiness and plants that will not lodge under conditions of high fertility.
Agron., Pl. Path., Veg., Pl. Brdg. 2-A, coop. USDA

N.Y.C.

Breeding and Testing Crop Plants. B. Breeding Corn for Silage and Grain. To (1) Continue propagation of inbreds for use in breeding and source of breeder's seed. (2) Evaluate introduced inbreds by testing the inbreds, and topcrosses of inbreds on single cross, (3) Crossing combinations of inbreds, (4) Retesting single crosses grown in 1950 to evaluate performance and for prediction of double-cross performance, (5) Tests of experimental double crosses at central station and in regional trials at ten locations, (6) Continue development of new inbreds, (7) Compare top-cross and selfed progeny performance as methods for evaluating early generation selfed lines, (8) Study effect of varying rates of planting on production of early, medium, and late maturing hybrids, (9) Study production and use of monoploid plants in development of inbred lines.

Agron., Pl. Path., Veg., Pl. Brdg., 2-B, coop. USDA

N.Y.C.

A Study of the Relationships Between Topography, Climate and Microclimate, and Crop Growth and Yield. To attempt to determine (1) what variations in weather, climate, and microclimate may be significant in producing special and temporal variations in plant growth and crop yield; (2) at what stages in growth of a plant meteorological variations may be most significant in their effect on final yield; and (3) relationships between microclimate and topography so that variations in microclimatic conditions may be estimated within areas where instruments are not situated.

Agron. 36

N.Y.C.

An Investigation of Methods for Improving the Quality and Economy of Production of Feed Crops in the Principal Soil and Climatic Regions of New York State.--II, Corn Investigations. To improve efficiency of corn production by decreasing costs per bushel of grain or ton of silage and by decreasing storage losses.

Agron. 38-II

N.Y.C.

An Investigation of Methods for Improving the Quality and Economy of Production of Feed Crops in the Principal Soil and Climatic Regions of New York State.--III, Small Grain Investigations. To improve efficiency of small grain production.

Agron. 38-III

N.Y.C. An Investigation of Methods for Improving the Quality and Economy of Production of Feed Crops for the Principal Soil and Climatic Regions of New York State.--- V. Crop Rotations for Dairy Farms. To (1) compare as to economy of feed production 3 main types of rotations; those producing primarily roughage, those producing the balance of grain of roughage needed for economical milk production, and those producing primarily grain; (2) determine proper time to fertilize, kind of fertilizer, and amount to use when fertilizing a rotation; and (3) determine value of manure on various cropping systems.

Agron. 38-V

N.Y.C. Drying of Grain, Legume and Grass Seeds, Beans, Forage Crops, and Other Farm Products. To (1) determine fundamental biological factors involved in drying of farm crops and seed; (2) determine type or types of equipment, including use of supplementary heaters and drying agents, best suited for economical drying of farm crops and seed in New York; and (3) design, build, and test drying equipment that will make possible the retention of a greater percentage of the original and desirable characteristics of farm crops.

Agr. Engin. 40

N.Y.C. Influence of Merchandising Practices on the Volume of Dry Bean and Lentil Sales. To determine how various retail store merchandising practices affect the sale of dry beans and lentils.

Agr. Econ. 51

N.Y.C. Studies on the Nature, Differences, and Evolution of Genetical Systems in Plant Populations. To study experimentally the composition of different types of genetical systems in plant populations and to investigate ways by which they can be changed.

Pl. Brdg. 57, coop. USPHS

N.Y.C. A Comparison of Several Methods of Estimating the Total Dry Matter Yield of Corn Plots Using the Green and Dry Weight of a Sample and the Green Weight of the Plots. To compare the accuracy of several methods of estimating the total dry weight of a line of corn in a replicated field experiment with the objective of finding estimation procedure which offers the greatest improvement over the "ration estimate" in current use by plant breeders.

Pl. Brdg. 68-1

N.Y.C. Cytogenetic Studies of Horticultural and Crop Plants.
To apply fundamental principles of cytology and genetics to development of new and improved varieties of horticultural and crop plants such as corn, iris, rye, canteloupes and Cattleya orchids and to eliminate defects of certain varieties such as partial sterility which are cytological in nature.
Bot. 73

N.Y.C. Diseases of Field Corn.--1. Stalk Rot Disease of Field Corn. 2. Seed Decay and Seedling Blight. To (1) make a survey of the corn disease problems in New York state, (2) study those of the most economic importance; and (3) conduct experimentation in an effort to devise an adequate control program.
Pl. Path. 78

N.Y.C. Diseases of Small Grains.--1. Crown Rust of Oats. 2. The Root Rots of Oats and Their Control. 3. Dwarf Bunt of Wheat. 4. Stem Rust of Cereals. 5. Oat Smuts Investigations. 6. Loose Smut of Wheat. 7. Foot-Rot or Sercosporella Eyespot of Wheat. To (1) determine the nature of the diseases causing damage to oats, wheat, barley, and rye in New York; (2) establish techniques for proper screening of material for resistance; and (3) develop measures for control of diseases of small grains.
Pl. Path. 79

N.Y.C. Breeding for Resistance to the Foot and Root Rots of Small Grains. To (1) differentiate & identify root & foot rots of small grains, (2) study epiphytology & control of Cercosporella eye-spot or foot rot of wheat, (3) learn relation of fertility, rotation & general cultural practices to the intensity of foot rot, & (4) screen small grains for resistance to foot & root rot organisms & to develop a breeding program to incorporate this resistance into varieties suitable for the region.
Pl. Path., Agron. 79-2 (NE-23)

N.Y.C. Chemical Control of Weeds Occurring in Field Crop Rotations and Permanent Pastures. To determine place of chemical weed killers in New York field crop rotations and best means of treatment involving time, rate, concentration, and method of application.
Agron. 89

N.Y.C.

Breeding for Cold Resistance in Small Grains. (1) Learn, separate, & study factors affecting cold resistance in small grains. (2) Develop lab. & field procedures for identifying cold resistant plants. (3) Screen small grains for sources of cold resistance & conduct breeding programs to develop winter hardy varieties.

Pl. Brdg., Agron. 100 (NE-23), coop. USDA

N.Y.C.

Methods to Improve Design and Utilization of Sprinkler Irrigation Systems. Learn (1) consumptive use of water by various vegetable, field, & pasture crops, (2) simple method for scheduling irrigation; (3) methods to increase efficiency of sprinkler irrigation system.

Agr. Engin., Veg., Agron. 105 (NE-22), coop. USDA

N.C.

Soil Fertility and Cultural Practices in Small Grain Production. To study (1) N fertilization & other needs of small grain as related to preceding crop & soil characteristics, & (2) effects of sources of phosphorus on growth & yields of small grain & the following crop lespedeza.

Agron., Soils 6

N. C.

Weed Control in Corn, Sorghum, Tobacco, Small Grain, Horticultural Crops, and the Specific Control of Bermuda Grass and Wild Garlic. To develop (1) field production practices to more efficiently control weeds in corn, sorghum, tobacco, small grain, & horticultural crops, & more efficient control methods for Bermuda grass & wild garlic; & (2) basic principles & practices involved in satisfactory farm use of above methods, to learn facts needed to understand failures if & when they occur, & methods of preventing such failures.

Agron. 7

N. C.

A Crop Drying and Curing Building for the Farm. To develop a building of general utility for all crops.

Agr. Engin. 11

N. C.

Opportunities for Increasing the Economic Efficiency of Grain Marketing and Utilization in North Carolina. To (1) determine the present system of handling, storing, transporting, and utilization of grain in N. C., & (2) estimate the present & potential demand and outlets for N. C. grain & to evaluate the adequacy of marketing system to meet the present and potential demand,

Agr. Econ., Agr. Engin. M-13 (SM-11), coop. USDA

- N. C. Quantitative Inheritance in Corn. To determine (1) characterization of genetic variation that will enable prediction of effectiveness of alternative breeding procedures, (2) comparison of observed & predicted results of breeding programs.
Gen. Agron. 15
- N. C. Relationships of Nematodes to Root Diseases of Crop Plants in the Southern States. To (1) determine occurrence, distribution & relative importance of various nematode species as plant disease causing agents in Southern states; (2) collect, isolate and maintain single species cultures of more important forms found; (3) study taxonomy, life cycles, host parasite relations & pathogenicity of more important species; & (4) determine relative importance of various species of plant parasitic nematodes in increasing incidence of other soil-borne diseases.
Pl. Path. 27 (S-19)
- N. C. The Control of Insects Affecting Stored Grain. To learn (1) changes in grain grade & other measures of quality with respect to levels of population of storage insects, (2) resistance of certain varieties to storage insect attack & causes responsible for resistance, (3) relationship between moth & weevil development in stored grain as affected by time of planting & harvest, (4) best fumigants & other insecticides for control of stored grain pest, with especial attention to Angoumois grain moth & rice weevil.
Ent., Agron., Chem., Anim. Indus. M27
- N. C. The Development of the Root System of Plants as Influenced by the Environment. To (1) characterize root systems of agriculturally important species and their varieties in order to determine certain aspects that may be used to differentiate their adaptation; (2) determine change in root distribution that may occur due to differences in soil properties and management practices; and (3) determine effect of any interaction that may occur within various pure and mixed plant populations.
Agron. 36
- N. C. The Life History and Control of Insects Affecting Stored Corn, with Particular Reference to the Rice Weevil and the Angoumois Grain Moth. To determine (1) most satisfactory fumigants or other insecticides to control rice weevil & angoumois grain moth, & best conditions under which these can be used; (2) effects of time of planting & harvesting on insects in stored corn; & effects of drying & different types of storage on development of pests in stored corn; & (3) rate of development of weevils & moths in stored corn that has been reported as showing some resistance to stored pest attack.
Ent. Agron. P59

- N. C. The Ecology, Cultural and Chemical Control of Insect Pests of Field Corn. To determine life history of more important insects of field corn and best chemical and cultural methods for their control.
Pl. Path., Agron. P60 Ent.
- N. C. Planting Methods and Machinery. (1) Evaluate effects of components of planting machinery in terms of physical environmental factors, seed germination & plant development. (2) Develop planting equipment that will fulfill optimum conditions for emergence in an effective & economical manner as determined under above objective.
Agr. Engin., Agron. 67 (S-2)
- N. C. The Development of Winter Oat Varieties with High Yields of Good Quality Grain and with Resistance to Diseases, to Winter Injury and to Lodging. To (1) develop thru breeding, varieties or strains of oats combining the following: a. resistance to crown rust, smut, mosaic, and Helminthosporium diseases; b. varieties with stiff straw and with enough winter hardiness to be grown thru the State with exception of very high mountain areas; and c. good yields of high quality grain; (2) evaluate promising new strains from above breeding program, or which may be available from ARS, or other experiment stations; and (3) make survey of oat germ plasm to find types which may contribute to above breeding program.
Agron. 78
- N. C. The Development of Soft Red Wheat Varieties with High Yields of Good Quality Grain and with Resistance to Diseases, to Winter Injury and to Lodging. To (1) develop thru breeding varieties or strains of wheat combining as many of these characteristics as possible: resistance to leaf rust, powdery mildew & loose smut, with selection to be made when possible for resistance to other diseases such as scab, glume blotch, & mosaic; high yields of grain of good baking quality & attractive appearance; & stiff straw to stand until ready for combining and sufficient winterhardiness to be grown throughout the state, with special varieties needed for high mountain areas; (2) evaluate for characteristics above, promising new strains from local breeding program, from USDA & other state experiment stations; (3) make survey of wheat germ plasm to find types which may be used as parents in above breeding program; (4) determine mode of inheritance of powdery mildew resistance in wheat.
Agron., Path. 79 (S-13), coop. USDA

N. C.

The Development of Winter Barley Varieties with High Yields of Good Quality Grain and with Resistance to Disease, to Winter Injury and to Lodging. To (1) develop thru breeding varieties or strains of barley combining as many as possible of the characteristics: resistance to powdery mildew, leaf rust, smut, mosaic, stripe, spot blotch and scald; varieties with stiff straw and with sufficient winter-hardiness to be grown throughout the state; & good yields of grain with heavy test weight & high feed value; (2) evaluate promising new strains from above breeding program or which may be available from USDA, or other state experiment stations; (3) make survey of germ plasm to find types which may contribute to above breeding program; (4) conduct investigations in genetic variability of barley & develop techniques for more effective selection in the improvement of the crop.

Agron., Path. Sta. 80 (S-13), coop. USDA

N. C.

The Effect of Deep Versus Shallow-Rooted Legumes and Subsoiling Practices on the Retention of Moisture on Heavy Piedmont Soils and Their Effect Upon Corn Yields. To study (1) effects of subsoiling practices & deep & shallow rooted legumes on retention of soil moisture; (2) effects of deep placement of lime & phosphate on penetration of alfalfa & lespedeza roots on Piedmont soils; (3) effects of legumes & subsoiling practices on yields of corn; (4) rates of N for corn following deep & shallow rooted legumes.

Agron., Statis. 81, coop. USDA

N. C.

The Effects of Legume and Non-Legume Winter Cover Crops on Corn Yields and some of Their Long-Time Effects on Soil Properties. To determine (1) some of the problems involved in growing winter cover crops, & determine response of cover crops to fall & spring nitrogen applications; (2) yield response of corn to rates of N application with & without various winter cover crops; (3) some of long-time effects of winter cover crops on soil physical and chemical properties & effects upon corn yields.

Agron., Statis. 82, coop. USDA

N. C.

The Effects of Cultural and Management Practices on the Properties of Tidewater Soils and Their Effects Upon Crop Yields. To determine (1) effects of cultural and management practices and degree of drainage of excess water on corn yields & physical characteristics of Tidewater soil; (2) what sod crops can be grown under varying degrees of artificial drainage on poorly drained Bladen soil; (3) effects of different sod crops on water permeability of Bladen subsoils; (4) water distribution relationship in poorly drained Bladen soil under different cropping systems, & receiving different degrees of artificial drainage.

Agron. Engin. 83, coop. USDA

N. C. The Effects of Rates and Time of Application of Nitrogen Phosphorus, and Potassium on Corn, and Soybean Yields in Rotation with Crimson Clover. To determine (1) yield response of corn to rates of N fertilization in a corn-soybean rotation with & without crimson clover cover crop; (2) yield responses of both corn & soybeans from rates of P & K applied at different stages in rotation; (3) effects of closely grazed crimson clover on corn & soybean yields, & effects of fertilizer treatment on yields of crimson clover; and (4) maintenance rate of application of P & K in corn-soybean rotation.

Agron., Statis. 84, coop. USDA

N. C. Nutritional and Physiological Studies of Corn. To study (1) physical distribution of actively absorbing roots of corn plant under various environmental conditions; (2) efficiency of phosphate fertilizers for corn production as influenced by placement; (3) growth habits of corn under varying water stresses; & (4) interrelationship between nutrient & water supply as affecting corn growth.

Agron. 85, coop. USDA

N. C. Breeding Investigations for the Improvement of Corn Strains Adapted to North Carolina. To (1) develop strains of corn which are adapted to each area in North Carolina; (2) develop methods of maintaining superior strains and aid in multiplication of such strains; (3) study breeding methods and genetic mechanisms related to corn; and (4) study inheritance of resistant factors in the host to important insects and diseases of corn under local conditions.

Agron.; Pl. Path., Ent. Statis. 86, coop. USDA

N. Dak. Biochemical Differences in Relation to Rust Reaction. To determine biochemical differences between varieties which may lead to resistance of the host plant to the invasion of rust parasite, particularly, to examine those factors which may affect the nutrition of the invading parasite.

Agr. Chem., Pl. Path., Agron., Bot. 2-2, coop. USDA

N. Dak. Pricing and Storing Process in Marketing North Dakota Grains. To (1) determine characteristics of pricing process for various types and grades of North Dakota grains; (2) trace effect of various storage facilities and costs upon grain marketing practices in North Dakota; and (3) study effect of various marketing practices upon producer prices and income.

Agr. Econ. 3-2 (NCM-10)

- N. Dak. Impact of Wheat Price Support Programs on Wheat Production, Marketing and Farm Income in North Dakota. To measure & appraise impact of wheat price support programs on acreage, yield & production of wheat; acreage & production of competing crops; prices received by farmers; farm income; marketing practices, storage & seasonality of sales; and protein & durum premiums & price differentials between goods.
Agr. Econ. 3-6 (NCM-11)
- N. Dak. Mechanical Handling of Silage and Grain from Storage to Feed Bunks in Open Feed Lots. To develop (1) plans for equipment to handle silage and grain from storage to open feed lot and automatic feeders in milking parlors; and (2) heating unit to thaw silage in upright silos, & investigate possibility of preventing freezing with use of salt and other materials.
Agr. Engin. 4-3
- N. Dak. Biology, Ecology, and Control of the Barley Thrips, Limothrips Denticornis Haliday. Learn (1) distribution, host plants, & life history of barley thrips in N. D.; (2) ecological factors causing sporadic appearance of this pest in barley fields; (3) effectiveness of insecticides less hazardous than parathion; (4) practicability of cultural & other methods of control.
Ent. 5-3
- N. Dak. Wheat Plant Structures in Relation to Wheat Stem Sawfly Resistance. Study histological structure of wheat plants as it may relate to sawfly resistance.
Ent. 5-5, coop. USDA
- N. Dak. Hard Red Spring Wheat Improvement. To (1) search foreign wheat collections of USDA for wheat varieties & relatives carrying desirable characters lacking in presently grown commercial hard spring wheat varieties; (2) combine desirable characters by crossing with best commercial varieties & new hybrid selections of hard red spring wheat; (3) make extensive plans & head selection from crosses in segregating generations & test progenies in nursery experiments to establish superiority & adaptability to spring wheat region; (4) establish milling & baking quality characteristics of prospective new wheats; & (5) increase superior wheats for release to growers.
Agron., Cereal Technol. 6-1, coop. USDA

N. Dak.

Cereal Crop Variety Testing. To test and evaluate cereal crop varieties for this area, including standard and new varieties being made available thru plant breeding departments in the several states, including 25-35 varieties of spring wheat, 3-7 of winter wheat, 5-10 of winter rye, 18-25 of oats, 18-25 of barley, 15-25 of flax, and miscellaneous crops.

Agron. 6-2

N. Dak.

Coordination and Supervision of Agronomic Research Projects in North Dakota. To coordinate and supervise the following field plot experiments in various places of North Dakota where soil and climate differ from that at the Central Station, Fargo: (1) Evaluating new cereal and forage crop varieties; (2) testing new crops including sunflowers, safflower, earlier ripening grain sorghums; (3) increasing and distributing seed of new varieties; and (4) tillage trials to better conserve soil and soil moisture.

Agron. 6-5, coop. USDA

N. Dak.

Breeding and Development of Corn for the Short Growing Season Areas Prevalent in North Dakota. To (1) isolate new inbred lines of corn which are adapted to the environmental conditions of the short and cool growing seasons of this area and which possess desirable agronomic characters (good ear height) and resistance to diseases (stock rot) and insects (corn borer); (2) improve the plant and seed characters and resistance to diseases and insects of inbred lines now used in early maturing hybrids by outcrossing to selected inbreds of desired character and backcrossing and/or selfing and selection; (3) introduce and study the adaptability of inbred lines originated in other Northern State Experiment Stations for use in North Dakota; (4) intercross and study combining ability and adaptability of selected inbred lines in top, single and double cross combinations as a prerequisite to the recommendation and release of new hybrids for commercial production; and (5) test reaction of North Dakota inbred lines with the cytoplasmic male sterile character for the purpose of possible use of cytoplasmic male sterility in commercial seed production.

Agron. 6-6

N. Dak. Low Temperature Endurance in Corn. To (1) test & evaluate ability of corn inbred lines to germinate & develop in seedling stage at sub-optimum temperature; (2) study association between a. ability to germinate & grow at sub-optimum temperature & ability to resist slight freezing in early seedling stages; & b. ability to germinate & grow at sub-optimum temperature & some morphological, physiological or pathological character of corn plant or kernel; (3) study effect of environment under which seed is produced upon reaction of progeny grown at low temperature; & (4) study rapidity of germination & ability to produce good stands under adverse, cold, wet soil conditions.

Agron., Pl. Path. 6-7

N. Dak. Breeding and Genetics of Spring Barley.---A, Breeding Spring Barley for Disease Resistance, Desirable Agronomic Characters, Malting and Feeding Quality. To produce varieties which are: (1) resistant to spot blotch, stem rust, and loose smut; (2) satisfactory in malting and feeding quality, and (3) suitable agronomically in yield, straw stiffness and head strength and ease of handling.

Agron. 6-8

N. Dak. Genetics and Associations of Inherited Characters in Wheat. To (1) establish basic information on inheritance of characters, qualitative & quantitative, in wheat; (2) establish genetic linkage relations for characters whose inheritance is known; & (3) elucidate associations between characters, particularly those economically important, or significant to the wheat improvement program.

Agron. 6-11, coop. USDA

N. Dak. Serological Aspects of the Nature of Rust-Resistance. Learn by serologic methods some of the basic factors of rust-resistance involving the host & the pathogen.

Bact., Agr. Chem. 8-2, coop. USDA

N. Dak. Wheat Protein Fractions and Baking Quality. To determine cause of differences in baking quality between protein fractions from different hard red spring and durum wheats and to ascertain effect of proteolytic enzymes upon properties and relative distribution of these protein fractions.

Cereal Technol. 10-1

N. Dak. Quality Investigations of Hard Red Spring Wheat Varieties. To insure development & release of new hard red spring wheat varieties of excellent quality in No. Dak., by determining milling & baking qualities & associated attributes of quality of varieties & hybrids from experimental plots at Fargo and branch stations.

Agron., Cereal Technol. 10-2

N. Dak. An Investigation of the Susceptibility of Starches to Attack by Alpha-Amylase. To develop a reliable method for estimating alpha-amylase activity of ungerminated cereals, especially barley, thru study of effect of starch gelatinization temperature & retrogradation upon alpha-amylase activity, & salts & proteinase activators influence on alpha-amylase of ungerminated barley. Irrigation influence upon amylolytic susceptibility of barley starch will be studied.

Cereal Technol. 10-3

N. Dak. Durum Wheat Quality Evaluation for Consumer Acceptance. To insure that new wheat varieties developed for resistance to current plant diseases, particularly the 15B rust complex, will be readily accepted by the consumers, and to develop new criteria of durum quality.

Cereal Technol. 10-4

N. Dak. Testing and Improvement of North Dakota Barley Varieties for Industrial Acceptance. To evaluate the malting quality of new barley hybrids with the object of improving the acceptability of North Dakota barley to the malting & feed industry.

Cereal Technol., Agron. 10-5, coop. USDA

N. Dak. The Response of Selected Farm Crops to Supplemental Supplies of Zinc and Boron in Relation to Varying Soil and Management Factors. To (1) test response of farm crops to supplemental zinc and boron as soil and spray applications under different soil conditions, (2) relate performance of selected crops with and without supplemental supplies of minor elements to soil characteristics and management factors, and (3) assemble chemical data leading to determination of critical limits and optimum concentrations of zinc and boron in plants and soil.

Agron., Pl. Path., Agr. Chem. 15-1

- N. Dak. Effect of Fertilizer on Selected Farm Crops Grown Under Irrigation on a Number of North Dakota Soils. To (1) obtain data to provide basis for sound recommendations for use of fertilizers on alfalfa; (2) obtain data on fertilizing corn and small grains used as nurse crops for legume or legume-grass seedings; and (3) relate results of treatment to profile characteristics such as texture, available phosphorus, pH, organic matter, lime and soluble salt content.
Agron. 15-5
- N. Dak. The Effect of Commercial Fertilizers and Plant Population on Yield & Soil Moisture Utilization by Corn. To learn effect of fertilizer & plant population on development & yield of corn & effect of soil moisture status under growing corn.
Soils, Agron. 15-6
- Ohio The Response of Winter Wheat Varieties and Strains to Climatic and Edaphic Factors. To determine effects of climate, soil characteristics, and soil management on yield and quality of winter wheat varieties and strains in Ohio.
Agron. 14, coop. USDA
- Ohio Breeding Field Corn for Ohio. To develop strains of corn superior to those now available in the different parts of Ohio.
Agron. 20, coop. USDA
- Ohio. Potash and Nitrogen Requirements of Corn and Oats as Affected by Sweet Clover and Other Crop Residues. To determine (1) rate of potash fertilization required to maintain crop yields where sweet clover is used as green manure for corn; (2) comparison of sweet clover and chemical N as sources of N for corn, alone and in combination with crop residues; and (3) influence of sweet clover alone and in combination with residues on the supply and release of soil potash at different rates of K fertilization.
Agron. 26
- Ohio. Oat Breeding and Testing. To (1) develop better varieties of spring and winter oats for Ohio and comparable areas; (2) inform producers of superior and also inferior oat varieties; and (3) develop new concepts and techniques which are needed in this and related fields.
Agron. 32, coop. USDA

Ohio

Production of Silages Under Controlled Conditions.

To (1) explore relation of effects of kind & condition of crop & holding temperatures, dry-matter content, silage densities & gases in voids on resulting silages in containers of up to 2 cu. ft. capacity, kept under controlled constant or varied conditions of temperature, density, drymatter, & crop condition; (2) extend to containers of Pilot Silo size conditions above found most promising; & (3) make available for large scale tests whatever promise to have farm application.

Agron., Agr. Engin. 41-3

Ohio

Chemical Analysis of Crops and Silage.

To (1) determine chemical composition of crops as ensiled and of silages made in main project or in individual subprojects; (2) relate changes in composition to various procedures or treatments given individual lots of silage; (3) relate chemical composition to human scoring and palatability to animals; and (4) develop new methods of improving existing methods of silage analysis.

Dairy Indus. 41-7

Ohio

Effect of Crop Rotations in the Incidence of Diseases Caused by Soil-Borne Pathogens and Associated Changes in Soil Fungus Populations. To determine (1) effect of rotation on incidence of diseases caused by soil-borne pathogens from relative amounts of damping-off & root rots of assay plants, (2) effect of rotations on numbers & types of soil fungi, & to correlate those changes with disease incidence, (3) host range of soil pathogens on field crops important in Ohio, & study antibiotic & antagonistic relationships, soil types, fertilizers, & organic matter which may affect their pathogenicity.

Bot. 63-1

Ohio

Chemical Control of Cereal Crop Diseases.

To (1) learn the value & effectiveness of the various cereal seed treatment compounds, (2) investigate possible use of low-cost foliar sprays or soil treatments for their application in cereal disease control, (3) study application of systemic pesticides to cereal crop disease control.

Bot. 63-2

Ohio

Eradication or Control of Weeds and Other Undesired Plants.--1. The Chemical and Cultural Control of Weeds in Field Crops Other Than Sugar Beets. To study (1) use and effectiveness of chemicals alone and with tillage in weed eradication compared with tillage alone and rates, dates, and methods of application of chemicals for maximum effectiveness on weeds and minimum injury to crops; (2) effects of herbicides on seed germination, composition, palatability, and other important properties of crop; (3) reaction of different varieties of crops to herbicides; (4) to devise specific systems of treatment for major noxious weeds of the state, using chemical, mechanical, and crop competition methods or combinations of them; and (5) to study relation of crop rotations to weed control.

Agr. Engin. 71-1 (NC-14)

Ohio

A Study of the Harvesting and Storing of Corn and Small Grains. To study the Ohio grain crops--corn, wheat and soybeans--in regard to the factors which insure good harvestibility and storage.

Agr. Engin., Agron. 82

Ohio

Mineral Nutrition of Corn.--1. Mineral Element Requirements of Pure Lines of Corn. To classify important pure lines used in hybrid corn program as to their ability to use the major and minor elements, and to study deficiency and toxicity symptoms of these elements in different growth stages.

Agron. 88-1, coop. USDA

Ohio

Mineral Nutrition of Corn.--2. Inbreeding Corn for High Mineral Accumulations. To produce inbreds that have in addition to their other desirable qualities high mineral accumulating abilities.

Agron. 88-2, coop. USDA

Ohio

Mineral Nutrition of Corn.--3. Mineral Nutrition of Corn Hybrids and Pure Lines. To determine most favorable ratio or balance of major ions for optimum growth of corn hybrids and pure lines.

Agron. 88-3, coop. USDA

Ohio

Corn Production, Corn Intercropping. To develop principles & practices of intercropping in corn which are adapted to Ohio corn belt agriculture as a means of (1) introducing green manure crops in corn, (2) making direct meadow seedings in corn, (3) extending practical range of corn-wheat sequence, & (4) developing new corn-grain combinations & sequences.

Agron., Agr. Engin., Ent. 102

Ohio

Economic Analysis of Grain Storage in Ohio. To (1) determine capacity, type, & location of grain storage facilities in Ohio & evaluate economic consideration influencing types & locations of new storage facilities; (2) discover possibilities for improvement in size, lay-out, location & organization of bulk grain storage facilities operated by terminal grain elevator & processing companies in order to increase efficiency of grain marketing systems as a whole in North Central States; (3) classify all elevator storage facilities into groups according to service & capacities, & to compare storage of each group (such as terminal, sub-terminal truck terminal, etc.), with a specific marketing area to the production of corn, wheat, oats & soybeans, within same area; (4) establish geographical marketing areas for grain in Ohio as determined by movement of local grain to terminal or sub-terminal which would be center of area; (5) analyze need for each type of storage within each geographical marketing area as determined by needs for storage within the area; (6) determine amount of suitable storage for grain on farms in Ohio & length of time each grain is stored in farmer storage; & (7) investigate economy that can arise thru elimination or modification of transiting grain thru Buffalo, or other markets when it could be shipped direct to processor

Agr. Econ., Sociol. 108 (NCM-10)

Ohio

Pesticidal Residues in Soils Following Pest Control Practices. To study (1) pesticidal accumulations & disintegration in soils of various types following applications for pest control; & (2) effect of pesticidal accumulation in soils upon soil flora & fauna & on the growth, quality, & yield of crops.

Ent., Bot., Pl. Path. 110 (NC-19)

Ohio

The Insect Phases of the Corn Research Program. 1. The Effect of Time of Planting, Weather, and Character of Plant Growth on Corn Borer Populations. To (1) identify & obtain information on relative importance of factors influencing abundance of borers in corn plant; & (2) gain better understanding of relationships of environmental factors to fluctuations oscillation, & levels of abundance of corn borer populations.

Ent., Agron., Bot., Pl. Path. 111-1 (NC-20), coop. USDA

Ohio

Wheat Price and Income Policy. (1) analyze methods used & costs of wheat price & income support programs in Ohio; (2) estimate effects of past wheat programs on farm income, wheat & other farm prices, wheat production, farm organization, marketing organization, costs & practices, & storage operations; & (3) apply above information so as to predict nature of changes to be expected from alternative policy programs which may be considered in the future.

Agr. Econ., Sociol. 125 (NCM-11)

- Ohio Quality Evaluation of Soft Winter Wheats. To learn factors responsible for differences in quality among soft wheat strains & varieties; & improve & develop standards for evaluating quality of soft wheats; evaluate quality characteristics of new strains from soft wheat breeding programs of station in region.
Field Crops 133 (NC-30), coop. USDA
- Ohio Marketing Costs and Pricing Methods of Grains in Ohio.
To improve the methods of pricing so they will more nearly reflect actual costs of performing the function.
Agr. Econ., Agron. ES 360
- Okla. Diseases of Wheat and Their Control. To (1) continue leaf-rust study to determine prevalent races and shifts in race populations, and watch for new races or build-up of what are now minor races; (2) thoroughly study race separation and identification, including races 21, 54, 105, and 126 which are particularly difficult to distinguish; (3) devise a method of collecting and storing rust samples which will maintain the viability of rust spores as present collection methods causes losses in viability up to 25 or 30 per cent; (4) study climatology in relation to winter survival and spring build-up of leaf-rust--establish a comprehensive weather station in close proximity to wheat where weather factors and winter survival can be correlated over a period of several years, and by close correlation of weather, initial inoculum available, and pustule counts to develop a system of predicting rust infection periods; (5) observe varieties and selections in various nurseries to determine their reaction to Septoria leaf blotch, to search for varieties or selections resistant to Septoria, and if possible, to determine how resistance is inherited; and (6) correlate weather records with intensity of Septoria infection to learn what factors control epidemics of the disease.
Bot. & Pl. Path. 772
- Okla. Storage Requirements for Oklahoma Wheat. To learn needed storage capacity & distribution of storage facilities to efficiently market wheat in Okla.
Agr. Econ. ES 280, RM:c 703

- Okla. Sorghum Breeding Investigations- The Development of Improved Varieties of Sorghums. To (1) develop by breeding: a dwarf quick-maturing high yielding kafir; a combine milo-kafir resistant to lodging, chinch bug damage & grain weathering; improved dwarf dafir, more resistant to lodging, insect damage and grain weathering and with heads ripening before stalks, than is found in other varieties; a dwarf combine sorghum for eastern Oklahoma; and forage and sirup sorghums resistant to leaf-spot disease & lodging; (2) study possibilities of hybrid sorghum seed development; & (3) determine reactions of the several sorghum varieties to insects.
Agron., Ent. 400
- Okla. Disease Resistance in Sorghums. To incorporate resistance to the leading sorghum diseases in the new sorghum varieties to replace disease-susceptible standard varieties in the Southwest; thus to reduce the annual losses of 10 to 20 per cent now suffered in sorghum production in this area as a result of sorghum diseases.
Agron., Pl. Path. 481, coop. USDA
- Okla. Breeding of Disease-Resistant Wheats Adapted to Oklahoma. To breed for (1) higher yield through more and larger seeds; (2) grain with higher test weight per bushel and with satisfactory kernel appearance; (3) disease resistance; (4) cold and drought resistance; (5) stiffer straw, non-shattering, and early maturity; and (6) varieties with suitable milling and baking characteristics.
Agron. 518, coop. USDA
- Okla. Oat Diseases and Their Control. To (1) develop adequate tests for resistance to crown and stem rust and anthracnose; (2) develop root disease garden where strains of oats can be tested for resistance to root organisms; (3) study variability of *Collectotricum graminicolum* and host range of the fungus; (4) study temperature and moisture needs of infection and disease development; and (5) closely observe breeding nurseries and commercial plantings for new diseases, or for serious outbreaks of diseases usually considered minor.
Pl. Path., Agron. 598 (S-13), coop. USDA
- Okla. Barley Diseases and Their Control. To (1) develop test for spot blotch resistance in barley, and test varieties from world collection for sources of resistance; (2) determine race or races of powdery mildew in Oklahoma, and test for resistance to these races; (3) grow regional mildew nursery in cooperation with USDA; (4) closely observe breeding material at Stillwater and commercial plantings for appearance of a new disease or outbreaks of diseases whose causal agents are known; and (5) establish root disease garden where resistance to root diseases can be evaluated.
Bot. & Pl. Path., Agron. 599 (S-13)

Okla. Diseases of Corn and Their Control. To (1) isolate inbred lines or other sources of resistance to stalk rot in corn by the process of testing in a cross with susceptible testers to obtain only the dominant types of resistance; (2) extend the testing of inbred lines to include studies on ear rot, first devising satisfactory inoculation method; (3) determine by isolation & inoculation organisms most prevalent on corn roots; (4) isolate resistant inbred lines as a result of greenhouse & field tests; (5) determine if any ecological relationships exist among various organisms causing root rot in corn; & (6) devise satisfactory method of testing for corn smut resistance.

Pl. Path., Agron. 607

Okla. Exploratory Studies in Radiations and Radiochemistry in Small Grains. To (1) determine validity of use of ultra-violet light in varietal testing of small grains; (2) use radiant energy sources to aid in production of insect, disease, and low temperature resistant varieties; and (3) explore uses of radioisotopes as energy sources and as tracers in small grains research.

Bot. Pl. Path., Agron. 861

Okla. A Study of Cropping Systems, Fertility, and Tillage Practices Necessary to Produce High Crop Yields. To study special cropping systems, fertility, and tillage needed to maintain or improve the productivity of certain soils in Oklahoma.

Agron. 872

Okla. Methods for Quality Evaluation of Small Wheat Samples. To (1) establish a satisfactory method for production of flour from small samples of wheat; (2) establish methods suitable for baking quality evaluation of flours from small samples; & (3) investigate relationships between milling & baking quality & chemical & physical properties of wheat.

Agr. Chem., Agron. 875

Okla. Investigation of Methods for Control of the Greenbug in Small Grains. To (1) investigate resistance of small grain varieties to greenbug attack in attempt to discover superior germ plasm for use in breeding program, & (2) experiment with insecticides in endeavor to replace recommended toxins with materials which are less toxic to warm-blooded animals, more effective at lower temperatures, more residual, more specific to injurious insects, & less expensive to the consumer; & to continue seed treatment experiments in attempt to find insecticides giving long lasting protection to small grains in seedling stage.

Ent., Agron. 894

- Okla. Cooperative Elevator Management. To learn ways cooperative elevators can be improved by changing management structure & operation so that they can make greater returns to farmers.
Agr. Econ., Field Crops 906
- Okla. Commercial Fertilizer Studies in Western Oklahoma.
To (1) learn N & P needs of soil types for high levels of crop production in western Oklahoma, & best time for applying N fertilizer for wheat in same area, (2) correlate crop response to N & P fertilizers with soil chemical tests, and (3) relate moisture status of soil to crop response under varied rainfall & soil conditions.
Agron., Soils 912, coop. USDA
- Oreg. The Marketing of Pacific Northwest Wheat Under Price Stabilization Programs. To determine effect of price stabilization programs upon marketing of Pacific Northwest wheat.
Agr. Econ. 206
- Oreg. Controlling Pests of Stored Grain and Stored Grain Products. To (1) determine nature, extent, and species involved in stored grain insect problem in Western Oregon, which area would typify a marine west-coast type of climate; (2) acquire biological and ecological data on insect infestations in stored grain in western Oregon which differ in type or intensity from infestations in other areas; and (3) use information from foregoing sources to prevent or control infestation in western Oregon and similar areas.
Ent., Farm Crops 99-5 (WM-16)
- Pa. Short Duration Fertilizing Experiments Involving A Coordinated Study of the Amount and Kind of Fertilizers and The Time and Method of Application Best Suited to Pennsylvania Crops, Soils, and Conditions. To determine (1) by farm trials what changes may be made in the amounts and analyses of fertilizers used on various farm crops and most suitable methods of applying such fertilizers for more economical production, (2) extent to which past soil management practices determine the analyses and amounts of fertilizer required, and (3) time of season applications should be made.
Agron. 749
- Pa. Corn Breeding. To develop corn hybrids better adapted to Pa. conditions.
Agron. 911-A

- Pa. Disease Resistance in Corn. To (1) continue to produce disease-resistant inbred lines of value to Pa. corn breeding program; (2) continue to develop & refine techniques for screening resistant material from open pollinated & hybrid populations; & (3) conduct fundamental studies on nature of disease resistance, on factors influencing it, & on its inheritance.
Bot., Agron. 911-B
- Pa. Resistance of Hybrid Corn to Insects. To (1) develop new & improve present techniques to evaluate hybrid corn resistance &/or tolerance to these insects: European corn borer, corn leaf aphid, Japanese beetle, southern corn rootworm, seed corn maggot, thrips, seed corn beetle, & wireworms; (2) evaluate field plot corn to establish its resistance &/or tolerance to insects listed above; & (3) study influence of environmental factors on resistance, &/or tolerance of hybrid corn to insects listed above.
Zool., Ent. 911-C
- Pa. Fertilization and Management Practices for Corn Production. To evaluate (1) effects of fertilizers, fertilization practices, & varying plant populations on the efficiency of production using new recommended hybrids in typical corn-producing sections of Pa.; & (2) soil physical & chemical properties which affect corn production.
Agron. 911-D
- Pa. Influence of Soils and Fertilizers on the Composition and Nutritive Values of Foods and Feeds. To study influence of nutritive conditions of plant growth on composition and nutritive values of agricultural products.
Agron., Anim. Nutr. 1019
- Pa. Improvement of Wheat, Oats, and Barley. To develop superior varieties of wheat, oats, and barley for Pennsylvania.
Agron. 1040, coop. USDA
- Pa. Tillage Tool Design and Performance. To improve design and performance of tillage tools by getting the information on soil resistance to them and relating this to design and control of tools, and (2) evaluate methods of plowing and seedbed preparation for corn and potatoes, considering yield, cost, suitability for stony land, and relating weed, insect and erosion control.
Agr. Engin. 1083

- Pa. The Influence of Various Fertilization Practices on Crop Yields and Crop Quality in Rotations. To determine most desirable fertilization practices for obtaining maximum yields and quality of each crop in a corn, small grain, and hay rotation consistent with efficiency production.
Agron. 1100
- Pa. Forage and Grain Production of Winter Small Grains as Influenced by Fertilization and Management Practices. To investigate (1) value of winter small grains as dual purpose crops, (2) management and fertilization practices for maximum forage production with minimum reduction in grain yields, (3) nutritional value of forage produced, and (4) if animals grazing such grains cause harmful soil compaction.
Agron. Agr. Biol., Chem. 1124
- Pa. Fundamental Genetics of Corn. To (1) detect monoploid plants & produce homozygous diploids for studies of agronomic & disease characters; (2) investigate pattern of inheritance of mineral deficiency in corn strains, particularly Mg deficiency; (3) incorporate glumeless ear character as a quality factor in field & sweet corn; (4) search for new genes, determine linkage relations of these & other unplaced genes, & develop new combinations as linkage testers; & (5) conduct studies which would implement the above.
Bot. 1192
- Pa. Air Distribution in Drying Hay and Grain. To (1) improve performance of hay and grain driers by studying ways of getting better distribution of air thru material being dried; and (2) develop improved technique for measuring air distribution in hay and grain.
Agr. Engin. 1198 (NE-13)
- Pa. Genetic, Cytological, and Physiological Factors Involved in Hybrid Sterility. To assay some of the possible factors that may be involved in the breakdown of the normal chromosome mechanisms in sterile hybrids.
Bot. 1215-A
- Pa. Influence of Environmental Factors on the Effectiveness of Herbicides. To determine (1) influence of soil moisture on effectiveness of 2, 4-D, CMU, etc. as pre-emergence herbicides on corn; (2) influence of soil organic matter, porosity, & fertilizer level on effectiveness of 2, 4-D as pre-emergence herbicide on corn; (3) influence of moisture, competition, light, & temperatures on 2, 4-D injury & weed control; (4) influence of nutrient concentration, N, & K balance on 2, 4-D injury in greenhouse; & (5) physiological, morphological & other changes in plants where injury has been induced by above treatments.
Agron., Engin., Bot., Pl. Path. 1229 (NE-12)

- Pa. Physiological and Nutritional Investigations of Corn and Other Crop Plants. To (1) develop tests to characterize fundamental interplant difference to aid in selection of inbreds, varieties or species for specific conditions, & in management of crops for production; & (2) evaluate inbred, varietal & species differences in nutritional & water needs.
Agron. 1238, coop. USDA
- Pa. Scald Resistance in Winter Barley. (1) Search for sources of scald resistance in barley so that parental material may be available for breeding scald resistant winter barley, (2) learn if scald problem is due to 1 or more pathogenic races of *Rhynchosporium secalis*, (3) investigate methods of inoculation to find best method for large scale outdoor testing, (4) learn if organism is seed borne.
Bot., Pl. Path. 1250
- Pa. Supplies and Prices of Concentrate Feeds in the Northeast. (1) Describe influence of prices & other economic factors on production of grains in Northeast, (2) evaluate effects of government farm programs on income from grains & on cost of feed.
Agr. Econ., Dairy, Agron. 1252
- Pa. Winterhardiness Investigations in Small Grains. (1) evaluate sources of winterhardiness in oats & barley. (2) Develop techniques satisfactory for screening hardy germplasm. (3) Initiate breeding program for development of more-hardy high yielding, stiff strawed oats & barley varieties possessing desirable quality characteristics & disease & insect resistance. (4) Investigate management practices which will increase winter survival.
Agron. 1258 (NE-23)
- Pa. Development of Insect Resistance in Small Grains. (1) Survey & evaluate small grain varieties, including presently used Northeast varieties, for insect resistance. (2) Develop new or utilize known techniques for evaluating insect resistance & its inheritance in small grains. (3) Investigate effect of environment upon expression of insect resistance in small grains. (4) Incorporate insect resistant stock into small grain varieties as integral part of breeding program for superior agronomic & pathologic characteristics.
Zool. & Ent., Agron. 1272, (NE-23), coop. USDA

- P. R. The Improvement of Native Field Corn by Selection and by Crossing Desirable Selfed Lines. To increase the yield of native field corn by selection and hybridization.
Pl. Brdg. 36
- P. R. Virus Diseases of Plants in Puerto Rico. The work will include (1) a survey to determine in order of importance the virus diseases attacking plants of economic value; (2) laboratory and field studies leading to the elucidation in each particular case of the virus or viruses, including transmission, grafting, insect vectors, identification, and means of dispersal; (3) study of the intermediate and wild hosts; and (4) methods of control, including a study, both in the laboratory and field, of rogueing of diseased plants, testing and use of immune or resistant varieties, elimination of intermediate or wild hosts of the viruses, control of insect vectors, vaccination, and therapeutic treatments by the use of heat and chemicals.
Pl. Path. 48
- P. R. Introduction and Evaluation of New Plants for Industrial and Other Purposes, and the Preservation of Valuable Germ Plasm of Economic Plants. To introduce economically important plants, evaluate them as sources of food and industrial use and as new germ plasm for crop improvement, and evaluate usefulness of some native species.
Pl. Brdg. 94 (S-9), coop. USDA
- R. I. The Effect on Soils and Crops of Long-Continued Use of Nitrate of Soda and Sulfate of Ammonia as Single Nitrogen Sources. To determine relative effects of nitrate of soda and ammonium sulfate, used a long time, on physical and chemical properties of soil, and to determine response of various crops to continued use of these N sources.
Agron. 202
- S. C. Corn Variety Tests. To evaluate commercial and experiment station hybrids, experimental strains, and open pollinated varieties in respect to yield, husk characteristics, lodging resistance, disease resistance, etc.
Agron. 1
- S. C. Small Grain Variety Tests, Rates and Dates of Seeding Tests, and Maintenance of Pure Seed of Certain Wheat Varieties. To (1) evaluate varieties & strains of small grains for yield, adaptation, disease resistance, maturity, etc.; (2) determine most efficient rates of seeding of certain recommended varieties of oats, wheat, & barley; (3) determine optimum time of seeding certain recommended varieties of oats, wheat, barley & rye; & (4) maintain pure seed of certain varieties of wheat released thru the experiment station by head selections.
Agron. 2

- S. C. Diseases of Small Grains. To determine causal organisms, reaction of grain varieties, sources of infection and value of seed treatment and other control measures.
Bot., Bact., Agron. 9
- S. C. Supplemental Irrigation. To (1) determine most effective and profitable use of supplemental moisture on crops of economic importance in South Carolina; (2) test and improve various methods of developing sources of water for irrigation; and (3) adapt, or determine adaptability of various equipment and materials to irrigation.
Agr. Engin., Hort. 17, coop. USDA
- S. C. Bionomics and Control of Heliothis Armigera (Hubner) as a Pest of Corn and Tomatoes. To determine factors in life history of the insect influencing its control, study physical properties of diluents and ways in which their effectiveness and usefulness may be increased, and test under field conditions combinations of chemicals and diluents showing promise of control in laboratory studies.
Ent. 18
- S. C. Control of the Rice Weevil and Associated Insects in Farm-Stored Corn and in Food Products Made from Such Grain. To (1) find an economical, practical method of controlling rice weevil and associated insects in farm-stored corn; (2) control insects in farm-stored corn intended for human consumption; and (3) investigate simple, practical procedures in producing clean corn meal from corn available in the state.
Ent. 20
- S. C. Effect of Three Rates of Nitrogen Fertilization with Continuous Corn and a Corn, Wheat-Lespedeza Rotation on Soil Structure, Organic Matter Content and the Occurrence of Minor Element Deficiencies on Selected Soil Type. To determine the effect of fertilization & cropping practices on soil structure & organic matter content, crop quality & yields, & occurrence of minor element deficiencies in plants & soils.
Agron. 58
- S. C. Breeding Small Grains. To (1) develop varieties of barley and wheat by selection, hybridization, and other breeding methods, which are resistant to loose smut, mildew, rusts, and other diseases; (2) develop by breeding high yielding varieties of barley and wheat of desirable agronomic types; (3) evaluate strains and varieties of all small grains as to ability to give high yields of good quality forage; and (4) develop ways of increasing initial or breeders seed of superior varieties and of maintaining genetic purity.
Agron. 60

S. Dak. The Breeding of Barley, Winter Wheat and Rye. To develop and test new strains especially adapted to the state, locate sources of earliness, improved disease resistance, winterhardiness, insect resistance, and quality and yield, and to investigate the genetic principles and breeding methods involved.

Agron. 25

S. Dak. Breeding and Testing Forage and Grain Sorghums and Sudan Grass. 1-6 To develop, (1) grain sorghums adapted for climatic conditions of state. Place emphasis on high yielding strains that stand longer after killing frost, possess open panicles, larger seeds, greater & sturdier seedlings as well as drought, insect & disease resistance, (2) forage sorghums & sudan grass low in hydrocyanic acid, early maturing & produce high yield of high quality palatable forage, (3) dual purpose large-seeded grain & sweet stalked forage types, low in hydrocyanic acid for silage & fodder, (4) male sterile lines & recover lines for hybrid sorghums, (5) new variants using colchicine, radiation, etc., (6) evaluate agronomic factors & adaptability of sorghums & sudan grass under climatic & environmental conditions of state, (7) cooperate with near experiment stations & USDA thru conferences, testing programs, & exchange of materials.

Agron. 61

S. Dak. The Breeding of Superior Field Corn Hybrids. (1) develop corn hybrids better adapted for environmental conditions of state; improve yield levels, & lodging resistance as it pertains to root & stalk weakness; work for better drought resistant hybrids; incorporate disease resistance, especially against root rot organisms; breed for insect resistance as corn borer; incorporate male sterile in hybrids available to public. (2) Develop new inbreds which, when used with each other or existing inbreds from various stations, will accomplish objectives in No. 1. (3) Study aspects of plant breeding for improving hybrids as; methods of selection & mating systems, aspects of heterosis, work on methods for developing drought-resistant inbreds, & methods for development of inbred lines thru use of chemicals & radiation. (4) Cooperate with experiment stations & USDA.

Agron., Pl. Path. 66

S. Dak. The Control of Root-Rot Diseases of Barley and Winter and Spring Wheat. (1) Search for sources of resistance to root-rot pathogens. (2) Evaluate influence of crop sequence &/or soil amendments on population of root-rot pathogens. (3) Learn cause & symptomology of soil-borne pathogens. (4) Learn losses, prevalence, & distribution of soil-borne cereal diseases in state.

Pl. Path. 115

S. Dak.

The Breeding of Spring Wheat. Durum Wheat, Oats and Flax. To (1) develop new strains of spring wheat, durum wheat, oats and flax; (2) locate new sources of desirable germ plasm for use in breeding; (3) recover desirable information on inheritance of genetic characters for improvement; (4) conduct cooperative relationships with USDA and other states.

Agron. 181

S. Dak.

The European Corn Borer in South Dakota.---Its Control, Life History and Distribution. To (1) determine extent and degree of infestation of the insect, (2) study life history under S.D. conditions, (3) study parasites and predators with a view toward introduction of new species into the state for biological control of the pest, and (4) on the basis of above information determine best combination of control measures.

Ent. 187 (NC-20)

S. Dak.

Grain Marketing Practices and Problems in South Dakota. To (1) determine & analyze major economic problems in marketing South Dakota grain products for purpose of determining improved marketing techniques; (2) investigate existing grain marketing framework, including ascertaining relevant physical characteristics of grain marketing in the state, & determining the underlying physical and economic forces contributing to prevailing grain marketing practices.

Agr. Econ. 224 (NCM-10)

S. Dak.

The Use of Crop Drying and Crop Conditioning Machinery and Equipment for South Dakota Crops. (1) Test practicability of conditioning wheat in storage by small electric motors & single air distribution ducts. (in cooperation with Commodity Research Division, Grain Branch, on CCC wheat in storage.) Minimum requirements of air flow & tube size will be learned. (2) Develop equipment for coordinating & comparing drying of crops in typical farm buildings as compared to carefully controlled conditions of experimental crop drying. (3) Equip a building & arrange equipment suitable for controlled drying tests on grain & hay crops. (4) Make available all crop drying equipment for careful research tests & for drying of crops under field conditions.

Agr. Engin., Agr. Econ. 246

S. Dak. Investigations of the Corn Rootworm Complex (Diabrotica SPP) in South Dakota, Their Economic Importance, Life Histories, Distribution and Control. To (1) learn extent & degree of infestation of corn rootworms in South Dakota; (2) learn economic importance of the insects to the corn growers of the state; (3) study life histories under South Dakota conditions; & (4) learn best combinations of control measures with which to combat corn rootworms in South Dakota.
Ent., Zool. 247

S. Dak. Cultural Practices for Improving the Efficiency and Stability of Crop Production in South Dakota. To (1) investigate with corn, the interrelationship between plant population, hybrid varieties and soil fertility levels on the yield, maturity, and quality of the crop; (2) study cultural practices which influence drought-resistance, winter survival and yields of small grain varieties; (3) investigate effect of interplanting of row crops with legumes or grains to improve crop; yields, soil fertility, and erosion control; (4) study factors in efficient use of fertilizers for crop production; and (5) cooperate with other Experiment Stations and USDA by participating in conferences and exchange of information on research.
Agron. 256, coop. USDA

S. Dak. Wheat Price and Income Policy. To ascertain social & economic effects of government program from these points of view: 1. volume & location of wheat production; 2. use of agricultural resources, land, labor, equipment, fertilizer, & other supplies; 3. production of other agricultural products; 4. wheat prices, size of farms, distribution & size of farm income; 5. size & mobility of farm population; 6. size & stability of real & money national income; & 7. milling quality & supplies of desired milling varieties of wheat.
Agr. Econ. 263 (NCM-11)

Tenn. Evaluation of the Performance of Varieties of Field Crops. (1) Learn performance of field crop varieties in important agricultural regions. (2) Evaluate performance data & make varietal recommendations. (3) Disseminate information concerning field crop varieties to farmers & agricultural leaders.
Agron. 33, coop. USDA

Tenn. Corn Improvement. (1) Develop superior inbred lines, resistant to disease, insect pests, & of high quality. (2) Produce superior single & double cross hybrid combinations from these & other inbred lines. (3) Learn influence of cultural practices on yield & quality of corn, with reference to production & maintenance of quality seed stocks. (4) Study methodology of breeding, including research in genetics & physiology. (5) In cooperation with other departments & agencies, study diseases & insects of corn & control methods. (6) Investigate crop qualities with reference to yield & value.

Agron. 34, coop. USDA

Tenn. The Comparative Value and Relative Efficiency of Various Phosphate Fertilizers Under Different Soil and Cropping Conditions. To (1) compare relative efficiency of fused tricalcium phosphate and dicalcium "nitraphosphate" of different particle sizes, concentrated superphosphate, ordinary superphosphate and rock phosphate on certain crops, and (2) study residual effect of various phosphates on succeeding crops.

Agron. 38, coop. TVA

Tenn. The Effects of Subsoiling, in Addition to Ordinary Plowing and Disking, on Crop Yields and Moisture and Organic Matter Content of the Soil. To compare effects of following tillage treatments on yields of crops in rotation: (1) ordinary turning, (2) subsoiling and turning, and (3) subsoiling and deep disking; and determine influence of tillage treatments on soil moisture levels and organic matter content

Agron. 41

Tenn. Oat Breeding. (1) To improve a winter-hardy oat adapted to Tennessee conditions by hybridization and selection; (2) to obtain a more desirable spring oat resistant to crown rust; and (3) to make genetic studies of characters, strong vs. weak straw, heavy vs. light kernels, resistance vs. non-resistance in the form of crown rust common to this section.

Bot. 80, coop. USDA

Tenn. Barley Breeding. (1) To obtain a smooth-awned winter barley adapted to Tennessee conditions, (2) to increase tillering in Tennessee Beardless & obtain a strain which shatters less readily than that now grown, & (3) to make genetic studies of tillering & shattering.

Bot. 81, coop. USDA

Tenn. Breeding for Improvement in Wheat Varieties to Include Resistance to Disease, Hessian Fly, and Changes in Morphological Characters. To (1) use present Tennessee lines to add softness & other desirable milling qualities-- earliness of maturity, short & stiff straw, smooth or awnless heads; resistance to black chaff, scab, & take-all; (2) incorporate resistance to Hessian fly; (3) select for feed & pasture types in crosses; & (4) test soft wheats for disease resistance in addition to those now available.

Pl. Path., Bot., Ent. 136, coop. USDA

Tenn. Root Diseases of Small Cereals, and the Nematode Relationship. To (1) continue basic investigations of root disease-inciting organisms, as to occurrence, relative importance, pathogenicity, taxonomy, & influence of environmental factors; (2) seek control of certain cereal root diseases by means of breeding, cropping practices, & fungicides; & (3) study root disease-nematode relationship in cereals.

Pl. Path. 137

T. H. Agronomic Crops.
Agron. 103

T. H. The Conversion of Forages and Byproducts Grown or Produced In Hawaii into Palatable and Nutritious Silage and the Determination of the Nutritive Value, by Actual Feeding Trials, of Ensilage Produced from the Most Promising Materials and Procedure Developed. (1) To develop, by feeding trials, the best and most economical rations for dairy animals, using the most promising and economical silages of strip cane, legume and nonlegume crops developed under subproject I to as great an extent as possible in replacing imported concentrates; and (2) to determine, by feeding trials, the economy of pen-fattening of beef on the most promising and economical silages of strip cane, legume and nonlegume crops developed under subproject I with and without the use of imported concentrates.

Anim. Husb. 275

Tex. Inheritance and Improvement in Corn. To (1) develop improved corn hybrids for various corn-growing regions of Texas; (2) obtain information on relative merit of different corn breeding methods; & (3) study inheritance of various characters in corn, with special reference to those of economic importance.

Agron. 227

- Tex. Inheritance of Sorghum. To (1) learn inheritance of characters in sorghum & their linkage relations as basis for further crop improvement; (2) learn nature & inheritance of certain physiological reactions in sorghum such as those to temperature & photo-period & evaluate effect of reactions on adaptation of varieties; (3) learn role of certain physiological reactions in expression of heterosis in sorghum; (4) classify varieties & strains for genes important in choice of parents for breeding programs & for use in sorghum hybrids; & (5) make cytogenetic & genetic studies on mechanisms of sterility & relations of perennial to annual legumes.
Agron. 498, coop. USDA
- Tex. Breeding and Improvement in Sorghum. To (1) improve upon present varieties of sorghum & to develop new & useful varieties thru hybridization, backcrossing, & selection; & (2) develop numerous useful strains for practical use of the phenomenon of hybrid vigor in connection with procedures for development of sorghum hybrids.
Agron. 499, coop. USDA
- Tex. Utilization of Legumes for Soil Improvement. To develop more practical systems of management of legumes for soil improvement in rotations with corn.
Agron. 513
- Tex. Studies of Hybrid Sorghum Seed Production. To devise a practical method or methods of producing hybrid seed of sorghum in commercial quantities.
Agron. Pl. Physiol., & Path. 610
- Tex. Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants for Industrial and Other Purposes, and for the Preservation of Valuable Germplasm of Economic Plants. To (1) introduce species & ecotypes of plants into Texas which might have possible agricultural value; (2) evaluate introduced plants as new crops, as prospective sources of new germplasm in crop improvement, for possible new uses; & (3) evaluate prospective usefulness of certain native species & forms appearing to be worthy of trial.
Agron., For., Hort., Flor. 717, (S-9), coop. USDA

Tex. Conservation of Water and Soil by Use of Cropping Systems and Belated Tillage Practices. To (1) determine effects of cropping systems & certain related tillage practices alone & combined with contouring, terracing & water spreading on crop yields, storage of available water in soil & amount & stability of crop residues maintained on soil surface; (2) determine effects of crop residues, mulches, chemical additives & tillage practices on moisture relationships, soil structure, & organic matter; & (3) evaluate cropping systems & tillage practices to determine if they are feasible, economical & sound from long time agronomic view point.

Agron. 900, coop. USDA

Tex. Marketing of Small Grains in Texas. To (1) describe present system of receiving, selling, handling, storing, distributing and using small grains in Texas including determinations of: geographic distribution of grain production and methods used by producers in handling each grain; advisability of a system of grades and standards for buying small grains; present storage practices, facilities and charges; present transportation facilities, practices and charges; and present users and handlers of grain; and (2) determine present and potential demands for grain in Texas and evaluate adequacy of marketing system to meet present and potential demand.

Agr. Econ., Agr. Engin. 932 (SM-11), coop. USDA

Tex. Marketing Efficiencies, Costs and Quality Improvement of Grains in the Gulf Coast Area as Affected by Farm Drying and Storage. To (1) make marketing study of economies involved in farm drying and storage of rice and grain sorghums in comparison with grain disposal immediately after harvest; and (2) determine effectiveness of recently installed mechanical drying and aeration equipment for improving quality of grain immediately after harvest and for maintaining quality during storage.

Agr. Econ., Engin. 940, coop. USDA

Tex. An Evaluation of the Rice Price Support Program. To (1) measure & appraise effects of federal price support, agricultural adjustment & surplus removal programs upon supply, domestic & foreign consumption, markets & prices & gross incomes for rice, (2) measure & appraise effects of rice program in terms of concurrent changes in farm enterprise combinations, market systems, & interrelationships of product & factor prices for rice & (3) study interconnections of programs for rice with programs for other farm commodities important in the South's agriculture, & to examine the interaction of effects of such programs.

Agr. Econ., Sociol. 942 (SM-14)

Tex.

Drying and Storing Sorghum Grains in Farm Storage Bins in South Texas. --1. In drying with unheated air, to determine effect of various rates of air flow thru stored grain of different initial moisture contents & at various depths on the following: rate of moisture removal, power needs, germination, infestation by microbiological organisms, fat acidity, & market grade; to modify existing air distribution systems as indicated by previous research & check uniformity of air distribution throughout the mass of grain; & to revise operating procedures for drying grain with unheated air; 2. In storing dry grains: learn minimum air flow needs for maintaining high quality grain with mechanical ventilation; establish operating procedures & use of automatic controls for aerating grain during storage; learn practical & economical methods of handling grain in & out of storage; learn effective means of controlling insects; & learn effects of moisture, temperature & different storage procedures on microbiological infestation.

Agr. Engin. 1001, coop. USDA

Tex.

Investigations of the Biology and Control of Greenbugs, Spider Mites and Other Insects Attacking Small Grains. To (1) learn occurrence, distribution, seasonal history, host plants, & their relationships, the influence of farm practices & environmental factors on greenbug & other aphids; several species of spider mites & other insects attacking small grains; (2) search for plant resistance to attack by greenbugs, mites, or other insects; (3) incorporate resistance to greenbugs available in certain Oriental barley varieties & in a selection of Dickinson wheat into varieties of barley & wheat adapted to Texas conditions; (4) when better resistance is found, incorporate this into breeding program; (5) study basis & causes of resistance; (6) determine effectiveness under field & laboratory conditions of commercial & experimental insecticides on control of said insects.

Ent. 1020, coop. USDA

Tex.

Drying and Storing Rice in Farm Storage Bins in Texas.
Drying with unheated air. To (1) determine effect of rates of air flow thru stored rice of different initial moisture contents & at various depths on: rate of moisture removal, power needs, germination, infestation by microbiological organisms, fat acidity, milling quality, (2) modify present air distribution systems as indicated by research, & check uniformity of air distribution throughout the rice, (3) revise operating procedures for drying rice with unheated air. Storing dry rice. To determine (1) practicability of using forced ventilation for maintaining quality during storage, (2) effective means of controlling insects, (3) practical & economical methods of moving rice during drying & in & out of storage, & (4) effects of moisture, temperature & different storage procedures of microbiological infestation.

Agr. Engin., Agron. 1002, coop. USDA

Tex.

Oat Improvement. To (1) develop or discover new varieties of oats superior to present varieties, & adapted to producing of grain, forage or a combination of the two from fall or spring seeding, (2) study cold resistance or tolerance of varieties & strains, cooperate in testing hardiness of introduced strains & study nature of winter hardiness in oats, (3) develop oat varieties resistant to crown rust, stem rust, & *Helminthosporium* blight, etc., (4) study forage & feed quality characteristics of oat varieties & strains under several environmental conditions, & develop varieties especially adapted for grain, winter pasture, hay or oat silage, (5) cooperate with Dept. of Ent. in search for oat germ plasm resistant to greenbugs, etc., (6) cooperate in regional trials of yield, disease resistance, insect resistance & winter hardiness, & development of multiple factor genetic stocks, (7) conduct research to increase knowledge of practical problems of the crop; study wild & cultivated species related to common oats for characteristics of value.

Agron., Pl. Physiol. & Path. 1027, coop. USDA

Tex.

Barley Improvement. To (1) develop or discover new varieties of barley superior to present varieties, & adapted to production of grain, forage, or a combination of the two, (2) incorporate into adapted varieties resistance to greenbugs from Omugi & other oriental varieties, & to continue search for resistance to greenbugs, etc., (3) attempt to incorporate resistance to diseases attacking barley, such as mildew, smuts, leaf blotches, & false stripe, (4) develop varieties resistant to leaf & stem rust for central & southern parts of state where overwintering of the diseases on barley may influence spread to wheat & barley farther north, (5) learn cold resistance or tolerance of varieties & new strains, & recommend use of varieties by areas in accordance with known hardiness, (6) give attention to forage characteristics of barley varieties & new strains in developing varieties suited for fall & winter grazing, (7) cooperate in trials of yield, tests of disease resistance, insect resistance, hardiness, & development of multiple factor genetic stocks of value in the breeding program, (8) investigate additional commercial uses for barley, (9) conduct research to increase understanding of practical problems of the crop.

Agron. Pl. Physiol., Path. 1029, coop. USDA

Tex.

Wheat Improvement. (1) Develop new varieties of wheat superior to present varieties & adapted to production of grain and/or forage, in state or introduce variety. (2) Study development of varieties resistant to diseases prevalent in each area as leaf & stem rust, smuts, mildew, septoria, & root rots. (3) Cooperate with Arlington College & regional quality lab. of USDA to learn quality characteristics of new varieties & strains, select best quality strains & learn means of measuring quality characteristics & evaluating strains. (4) Study forage characteristics of varieties & strains & develop varieties suited for winter pasture, hay, or other feed. (5) Learn cold resistance of strains for release. (6) Cooperate with entomologist in search for resistant germ plasm to greenbug attacks, etc.. (7) Cooperate with states & USDA in regional trials of yield, disease & insect resistance, winter hardiness & development of multiple factor genetic stocks.

Agron., Pl. Physiol., Path. 1033

Utah

Relation of Soil Moisture Regime and Nutrient Supply on Plant Nutrition and Soil Productivity. To (1) study effect of irrigation regime on soils & crops; (2) determine interrelationships of method of irrigation, soil moisture condition, & nutrient needs for crop; (3) study water needs of various crops as related to weather conditions; & (4) relate movement of water in soil to forces that retain water & to study ways of modifying these forces.

Agron. 306 (W-29)

Utah

Improvement of Fall Sown Wheat Through Breeding. To combine through breeding high yield, resistance to covered smut, winter hardiness, good milling quality, and other desirable characteristics in winter wheat for fall seeding on dry and irrigated lands.

Agron. 328, coop. USDA

Va.

Control of Subterranean Insects Affecting Seedling Corn. To learn (1) efficiency of following procedures: a treating seed with an insecticide prior to planting; b insecticides in granulated form or as sprays applied in row; c insecticide-fungicide combinations as seed treatments, (2) effects by observation of more promising soil insecticides & seed protectants on seed germination & plant growth, (3) effect upon final yields of corn obtained from controlling said insects.

Ent., Agron. 8341

Va.

Physiology of Disease Resistance of Corn and Tobacco. To (1) work out biochemical or biological lab method to test tobacco for resistance to black shank disease and corn for resistance to certain fungus diseases; (2) correlate, if possible, resistance of corn to certain fungus pathogens with physiological processes which are initiated by specific genes; (3) undertake comprehensive study of physiology of pathogens which cause black shank disease of tobacco and corn leaf blight; and (4) obtain better understanding of causes of disease resistance and physiology of parasitism.

Pl. Path., Physiol. 86019

Va.

Development and Utilization of Adapted Corn Inbred Lines and Hybrids with High-Protein and High-Oil Grain. To (1) isolate inbred lines which have high oil and high protein in the grain and which are adapted for use in Va.; (2) utilize these inbred lines in combinations with themselves or other inbred lines in the production of adapted, high yielding hybrids higher in oil and protein than those now in use; (3) study inheritance of oil and protein in corn grain during inbreeding and subsequent crossing; (4) study chemical and genetic reasons for the inherent high-protein content of high-oil selection; (5) study chemical nature of the protein in the most promising selections by amino acid determinations; (6) study chemical nature of the oil in the most promising selections by analysis of the lipid fraction; (7) study niacin content of the most promising selections; and (8) study nutritive value of the most promising selections by rat feeding experiments.

Agron., Biochem. 86035

Va.

Development and Selection of Adapted Corn Inbreds and Hybrids. To (1) develop and maintain a source of superior germ plasm (inbred lines) adapted to Va. conditions by inbreeding open-pollinated varieties, combinations of inbred lines, &/or combinations of open-pollinated varieties with inbred lines; (2) develop by combining inbreds developed by the Va. Agricultural Experiment Station & other experiment stations hybrids which are adapted to growing conditions in Va. and adapted to planting methods found to be most advantageous; (3) thoroughly test experimental corn hybrids developed by the Va. Station and others obtained from other experiment Stations with respect to adaptation to Va. conditions, (4) cooperate with other experiment stations and make available to them seed of any inbred lines or hybrids which have been developed under this project and which they might find of value; and (5) to study and establish relationships that may exist between physical and genetic characteristics of inbred lines and their crosses.

Agron., Ent., Biol. Pl. Path. 86041, coop. USDA

Va.

Development of Oat Varieties Adapted to the Coastal Plains Region of Virginia. To develop (1) varieties of oats specifically adapted in growth type to eastern Virginia, high yielding, high in grain quality as measured by bushel test weight, stiff strawed, & resistant to major oat diseases of eastern Virginia; (2) varieties which produce high forage yields for grazing in fall & early spring, & are satisfactory for grazing production either when properly grazed or not grazed; & (3) varieties specifically adapted to high grain production when planted in late winter.

Agron. 86052, coop. USDA

Va.

Diseases of Barley, Oats, and Wheat and Breeding of Disease-Resistant Varieties. To (1) develop varieties of barley, oats, & wheat resistant to rusts, smuts, powdery mildew, & other damaging diseases; (2) culture organisms causing the diseases, & determine effects of environment on them; (3) study histologically & physiologically the processes of diseases caused by these organisms; (4) study genetics of causal organisms & related cytological phenomena (5) develop methods of control of small grain diseases & promote use of known methods; & (6) study inheritance of resistance to small grain diseases.

Pl. Path., Physiol. 86057

- Va. Diseases of Corn and Breeding of Disease-Resistant Varieties of Hybrid Corn. To (1) develop inbred lines & hybrid varieties of corn with resistance to leaf blight, stalk rot, root rot, rust & smut; (2) culture organisms causing diseases of corn & learn effects of environment on them; (3) study genetics of pathogenicity & variations of causal organisms & related phenomena; (4) develop methods for control of corn diseases & to promote use of known methods; & (5) study inheritance of resistance to corn diseases.
Pl. Path., Physiol. 86058
- Va. Chemical Weed Control in Corn and Alfalfa. Develop safe & economical chemical control of various types of weeds at different stages of growth of alfalfa and corn.
Agron. 86073
- Wash. Adaptation Studies of Cereal Varieties in Washington. To (1) determine relative performance of cereal varieties in various climatic and soil areas of Washington at different fertility levels, and (2) effect coordinated plan for testing cereal varieties on a state-wide basis.
Br. Stas. & Agron. 175, coop. USDA
- Wash. Investigations on Root Rots and Foot Rots of Cereals and Grasses in Eastern Washington. To (1) determine distribution, prevalence & economic importance of root & foot rots of cereals & grasses in Eastern Washington; (2) determine cause(s) of these diseases; & (3) develop control measures.
Pl. Path. 864
- Wash. The Transfer of Economic Characters from Related Genera and Species to Common Wheats. To transfer immune or high type of resistance to available races of leaf and stem rust, bunt, mildew, and other agronomic characters, such as solid stems, and shorter, stiffer straw from available *Triticum* and *Agropyron* species to stable hexaploid wheat derivatives of value as parents in future wheat varieties.
Agron. 966
- Wash. The Development of New Wheat Varieties for the Big Bend Dry Land Area of Washington. To develop high-yielding wheat varieties with desirable quality and varietal characteristics facilitating combine harvesting in this general area.
Agron. 993, coop. USDA

Wash. Breeding and Improvement of Spring Wheat Varieties for Washington. To develop spring wheat varieties with these characteristics: as wide or wider ranges in baking characteristics as Idaed or Baart; winter-spring seeding habit better than Orfed or Marfed; high type resistance to diseases such as bunt, leaf and stem rust, and mildew; greater lodging resistance than Baart for dry land conditions; wider range of adaptability than Idaed or Marfed; shorter straw for high rainfall areas and conditions than found in present varieties.

Agron. 994, coop. USDA

Wash. The Development of Winter Wheat Varieties for Eastern Washington. To (1) develop new winter wheat varieties representative of these improvements: increased adaptation to early fall seeding for greater control of erosion on steep land; reduction of plant height and straw tonnage, and improvement in lodging resistance; increased toughness of rachis to improve threshability of lodging- and shatter-resistant varieties; better milling qualities of multi-purpose semi-hard wheats; increased resistance to important wheat diseases; and (2) conduct genetic studies to determine mode of inheritance of most desirable characters affecting growth habit, disease resistance, plant height, lodging resistance, threshability, milling and baking qualities, and yield.

Agron. 996, coop. USDA

Wash. Fundamental Genetic, Cytogenetic, and Radiobiological Studies in Cereals. To (1) study biological effects of X-rays & other radiations, (2) utilize ionizing radiation in production of new genetic & cytogenetic phenomena in wheat & barley which will aid in breeding & genetic analyses, (3) study effect of temperature, atmosphere, moisture, etc. applied before, during, & after radiation in modifying biological effects of X-rays, neutrons, & gamma rays, & the experimental control of induced mutation process, (4) study spontaneous mutations & chromosomal aberrations.

Agron. 1002, coop. AEC

Wash. Breeding and Genetic Studies in Barley. To (1) develop improved varieties of barley for Washington and the Pacific Northwest; (2) use genetic knowledge of agronomic characters in development of better barleys; and (3) study genetics of agronomic characters where information is not available but is needed for efficient attainments under (1).

Agron. 1006

- Wash. Breeding Wheats Resistant to Stem Rust (Including Race 15B) and Leaf Rust for Washington. To incorporate and test resistance to stem rust, (including race 15B) and leaf rust in new selections for wheat for Washington.
Agron. 1081, coop. USDA
- Wash. Control of Insect Pests of Stored Grain. To (1) evaluate chemical grain protectants for control of wide range of stored grain insect pests which occur in the Pacific Northwest; (2) evaluate insecticides as residual sprays on walls of storage facilities; (3) evaluate grain losses incurred by each important grain infesting species; (4) conduct intensive survey to trace seasonal development of insect population in storage facilities, to evaluate role of sanitation practices, & attempt to correlate insect infestations with type of storage unit construction; & (5) conduct other pertinent studies on stored grain insects.
Ent. 1127 (WM-16)
- Wash. Soil Fertility Investigations. To (1) evaluate ability of soils in eastern Washington to supply under high levels of productivity the nutrient elements not now considered limiting, (2) determine & evaluate role of the climatic, soil, & plant characteristics affecting interpretation and extrapolation of results of field fertilizer trials, & (3) determine effects of method, time and rate of application of fertilizer materials on yield & quality of the crops for which this information is not now available.
Agron. 1142
- Wash. Wheat Prices and Price Policies in the Pacific Northwest. To analyze (1) price structure for wheat with reference to relation of prices of soft & hard Pacific Northwest wheats to prices of other wheats in both U.S. & world markets; (2) short-run & long-run effects of different levels of wheat prices on production of & income from wheat in Washington under conditions of no production controls; & (3) effect of various alternative price & production controls for wheat on structure of wheat prices, on structure of agricultural production, & on income from agriculture in Washington.
Agr. Econ., Agron. 1223, (WM-13), coop. USDA
- Wash. Induction of Genetic Variability in Barley by Ionizing Radiations. To (1) use ionizing radiations to induce beneficial agronomic mutations to barley; (2) use ionizing radiations to increase genetic recombinations, i.e., increase crossing-over & break "tight" linkages; & (3) study other possible ways in which ionizing radiations may be a useful tool in barley improvement.
Agron. 1233

Wash.

The Effect of Various Constituents on the Utilization of Wheat Straw by Pregnant Beef Heifers. (1) compare effects of feeding wheat straw & alfalfa hay on the performance & well being of pregnant heifers, (2) increase use of wheat straw by increasing available N, attempting to balance mineral needs of the rumen microflora & the host heifer, (3) determine if pregnant heifers, consuming primarily wheat straw, will obtain sufficient vitamin A to prevent deficiency syndromes, and determine extent of vitamin A deficiency, if any, & (4) determine if small amounts of dehydrated alfalfa will stimulate the consumption & use of wheat straw.

Anim. Husb. 1242

Wash.

Virus Diseases of the Cereals and Grasses. To (1) learn virus diseases of cereals & grasses in state, their distribution, prevalence & severity, cereals affected, forage & weed grasses harboring them, & pertinent factors in spread of disease, (2) develop resistant varieties or other control.

Pl. Path., Agron. 1280

Wash.

The Influence of Specific Organic Compounds in the Soil Solution (Other than Anti-Biotics) on the Development of the Root and Crown Rots of Cereals and Grasses. To learn influence of specific organic compounds on development of root & crown rots of cereals & grasses (if they increase or decrease disease level) & if they influence formation of resting spores or other structures of survival formed by pathogens within diseased root & crown tissues.

Pl. Path., Soils, Agron. 1286

Wash,

Processing and Treatment of Barley to Improve its Nutritional Value for Poultry. To (1) effect of removing fibrous hull from barley grain on its nutritional value for poultry, (2) effects of different processing treatments as steaming, toasting, & autoclaving on nutritional value, (3) investigate different methods as pearling & grinding followed by sifting to remove fibrous hull, (4) relative acceptability of differently processed barley as compared to wheat or corn.

Poultry, Anim. Husb., Agron. 1291

W. Va.

Determination of Factors Influencing the Drying Rates of Grains. To determine (1) limitations on removing moisture from grain, (2) critical temperatures, air volumes, humidities, air velocities, time factors, and (3) effect that drying conditions have on germination.

Agr. Engin., & Chem. Engin. 15

W. Va. Corn Genetics and Breeding. To study (1) mode of attack, (2) chromosomal translocations with reference to linkage in chromosome 5, (3) crossing-over in chromosome 1, in a special translocation stock, (4) production of superior hybrids of dent corn adapted to West Virginia, (5) production of yellow-seeded varieties of Woodburn White Dent, and (6) production of strains of sweet corn adapted particularly to the Point Pleasant area with high quality, uniformity, earliness, and resistance to disease and ear-worm damage characteristics.
Genet. 29

W. Va. The Interrelation of Soil Fertility, Planting Rate, and Geometry of Spacing in Relation to Yield of Various Hybrid Corn Varieties. To (1) determine optimum population and spacing of various corn varieties at different fertility rates: and (2) correlate effect of rate of planting and plant spacing with observed plant characteristics which include ear size, shelling percentage, stalk barrenness lodging, and nutrient uptake.
Agron., Genet. 38

W. Va. Crop Rotation Experiments. To determine (1) efficiency of various cropping systems in production of feed per acre; (2) effect of soil fertility level on efficiency of production of various cropping systems; & (3) effect of cropping system on physical, chemical, & biological properties of soil.
Agron., Genet., Agr. Econ., Rural Sociol. 43

W. Va. Weed Control in Corn. To: (1) determine and demonstrate effective methods of weed control in corn, under W. Va. conditions; (2) study chemical weed control as related to type of herbicide, concentrations employed and time and frequency of application in corn; (3) compare cultural methods of weed control including flame cultivation, with chemical control, in corn; (4) determine crop and weed response to the various methods of weed control; (5) secure information on the economic losses caused by weeds and the cost of control methods in corn.
Agron. 52

W. Va. Cereal and Forage Crop Pests - Their Distribution, Incidence, and Control in West Virginia. To (1) determine distribution incidence & to estimate the economic importance of the principal field & forage crop pests (insects, mites & nematodes) in the State; & (2) devise effective control measures for those pests found to be doing economic damage.
Pl. Path., Bact., Ent. 80

- W. Va. Breeding Winter Barley for High Yields and Powdery Mildew Resistance. To (1) develop high yielding varieties of winter hardy barley resistant to powdery mildew, (2) study reaction of available strains to prevalent strains of mildew in field & greenhouse.
Agron., Genet. 86 (NE-23)
- Wis. Development of Superior Strains of Hybrid Field and Sweet Corn. To develop superior strains of (1) field corn, that have suitable adaptation; produce a high yield of grain & silage, resistant to seedling, stalk, & ear diseases as well as to various insect pests; have capacity to germinate & give satisfactory stands & development under low temperature; & produce waxy & sun-red strains & (2) sweet corn for canning & market garden purposes.
Hort., Pl. Path., Dairy & Food Indus., Ent., Agron. Genet. 309
- Wis. The Varieties of Barley and the Cultural Practices Dealing with the Production of Barley and Breeding for Malting Quality. To breed new barley varieties for economical grain production and good industrial quality.
Agron. 530, coop. USDA
- Wis. Development and Adaptation of Agricultural Machinery, Surface Drainage Systems, and Crop Management for a Productive, Soil Conserving System Suited to Inadequately Drained Soils. To (1) investigate tillage and harvesting equipment to improve performance of machinery across various type terraces at normal field operating speeds; (2) study terrace designs and methods of construction to improve surface drainage and facilitate operation of modern farm machinery over the terrace system; and (3) develop grain and forage programs for imperfectly drained soils which have been improved by establishment of terrace drainage systems.
Agr. Engin., Soils & Agron. 729, coop. USDA
- Wis. Applications of Plant Growth Substances and Their Mechanism of Action. To amplify present applications, develop new uses for plant growth substances, determine manner in which they exert their effects, and investigate their use in controlling starch production of peas and their influence on protein content of field crops.
Agron., Biochem. 755

- Wis. The Origin of New Gene Forms in Corn. To (1) characterize kinds of mutations occurring naturally at the P locus in somatic tissues, (2) compare spontaneous and artificially induced mutations, (3) measure frequency of mutations of different P alleles, and (4) study factors conditioning mutation process.
 Biochem., Genet. 777
- Wis. Host Plant Resistance to the European Corn Borer. To learn (1) factors affecting survival & establishment of European corn borer larvae on corn plants, (2) relative importance of factors in varietal differences in susceptibility to corn borer.
 Ent., Zool., Field Crops 958
- Wyo. Breeding and Selection Studies with Barley. To (1) develop improved varieties of barley, outstanding for yield, with desirable agronomic characters & with disease & insect resistance; (2) determine & recommend outstanding varieties for production in Wyoming; & (3) be responsible for a source of genetically pure breeders seed of recommended, named, & released varieties of barley thru the Station & Wyoming Crop Improvement Association, primarily to the public.
 Agron., Agr. Econ. 487
- Wyo. Breeding and Selection Studies with Wheat. To (1) develop improved varieties of wheat, outstanding for yield, desirable agronomic characters, & disease & insect resistance; (2) determine & recommend outstanding varieties for production in Wyoming; & (3) be responsible for source of genetically pure breeders seed of recommended, named, released varieties thru the Experiment Station & Wyoming Crop Improvement Assn., to the public of Wyoming.
 Agron., Agr. Econ. 489
- Wyo. Breeding and Selection Studies with Oats. To (1) develop improved varieties, outstanding for yield, agronomic characters, a disease & insect resistance; (2) determine & recommend outstanding varieties for Wyoming production; & (3) be responsible for a source of genetically pure breeders seed of recommended, named, released varieties thru the Station & Wyoming Crop Improvement Assn., to the Wyoming public.
 Agron., Agr. Econ. 490

Wyo. Chemical Elements in Forage, Browse and Crops. To determine the trace element content of forage, browse, and crops from so-called deficient and normal areas of Wyoming, and from the results draw conclusions as to feeding quality of plants in those areas.

Res. Chem. 492

Wyo. The Effect of Cropping Practices on Yield and Some Physical and Chemical Properties of the Soil. To (1) determine effect of continuous cropping & alternate crop & fallow on yield of winter wheat, spring wheat, oats, barley & corn; (2) determine effect of kind of crop & continuous vs. alternate crop & fallow on certain physical & chemical properties of soil; (3) compare effect of crested wheat, alfalfa, & a mixture of them in maintaining soil N & organic matter content & yield in 12 year rotations with corn, spring wheat & oats; (4) compare effect of manure vs. no manure in continuous cultivation on N, organic matter content, & soil physical properties; & (5) compare effect of continuous cultivated rotations vs. sod crops in rotation on yield & chemical & physical soil properties.

Agron. 539, coop. USDA

Wyo. Study of Dry Land Farming Areas in Eastern Wyoming. To determine (1) existing patterns of dry-land organization and resource use; (2) alternatives used by and available to dry-land operators to minimize effects of risk and uncertainty in prices and production; (3) proper substitution of grass and wheat on dry land under various product price and cost levels; and (4) to what extent absentee residents operate dry land wheat farms in the area.

Agr. Econ. 549

Wyo. Diseases of Small Grains. To (1) determine extent of infected areas, classify specific viruses, and find host range, methods of spread and varietal resistance; (2) study prevalence and severity of cereal rust and test value of chemicals for control; & (3) ascertain general diseases of cereals to determine importance of diseases present & new diseases that may occur.

Agron. 559

Wyo. Biology and Control of Small Grain Arthropods. Learn arthropods present in small grains, their damage, bionomics, control & distribution; & bionomics & control for wheat curl mite.

Ent., Parasitol., Agron. 594

Wyo.

Development and Evaluation of Methods of Study of Fungus-Induced Root Diseases. (1) Devise & evaluate a rapid, efficient, reliable method of isolating fungus pathogens of root diseases of as many crops as possible. (2) Develop methods of experimentally establishing the degree of virulence & host range of a pathogen yielding reproducible results.

Agron., Pl. Path. 598

Wyo.

Drought Resistance Studies with Winter Wheat Seedlings. To (1) obtain selections of winter wheat exhibiting drought resistance in seedling stage, (2) learn heritability percentage of same, & potential of selected strains as possible new varieties or improved selections of the variety Cheyenne.

Agron. Pl. Physiol. 603

Regional Projects

NC-7

The Introduction, Multiplication, Preservation and Determination of Potential Value of New Plants, for Industrial and Other Purposes and for the Preservation of Valuable Germ Plasm of Economic Plants. To: (1) cooperate in an exploration program for foreign and domestic plant materials and determination of their potential industrial or other value; (2) set up a primary regional plant introduction station for such seed or planting stock adapted to and of potential value in the North Central Region with secondary stations when necessary; (3) catalog, preserve, multiply and distribute such materials; (4) maintain and preserve the germ plasm of crop plants of economic value; and (5) to coordinate this program with that of other regions.

Cooperating stations: Ill., Ind., Iowa, Kans., Mich., Minn., Mo., Nebr., N. Dak., Ohio, S. Dak., Wis.

NC-30

Quality Evaluation of Soft Winter Wheats. To: (1) determine the factors responsible for differences in quality among soft wheat strains and varieties; (2) develop new procedures and improve standard procedures for evaluating the quality of soft wheats; and (3) evaluate the quality characteristics of new strains from the soft wheat breeding programs of stations in the region.

Cooperating stations and agencies: Ill., Ind., Mich., Minn., Mo., Ohio, Wis.; and USDA

NCM-10

Economics of Grain Storage. To: (1) evaluate the economic considerations influencing capacity, type and location of grain storage facilities; (2) determine economics of quality changes which occur under different methods and periods of storage; (3) analyze storage costs and factors influencing them under various alternative storage conditions; (4) analyze and evaluate public grain warehouse legislation and administration in the various states.

Cooperating stations: Ill., Ind., Iowa, Kans., Minn., Mo., Nebr., N. Dak., Ohio, S. Dak.

NE-9

Discovery and Preservation of Valuable Plant Germ Plasm. The Introduction, Testing, Multiplication, and Preservation of Potentially Valuable Plants for Crop Improvement and Industrial Uses. To: (1) maintain and preserve germ plasm of field and horticultural plants of economic value to the states of the Northeastern Region; (2) cooperate in plant exploration to obtain materials of potential value as sources of new germ plasm; (3) establish and maintain a primary regional introduction station to handle introduced and domestic seed plants adapted to the Northeast; (4) initiate a program of testing, multiplying, preserving, cataloging and distributing introduced materials for the purpose of discovering their value for plant improvement in the region; and (5) coordinate the program in the Northeast with programs in other regions.

Cooperating stations and agencies: Conn., Del., Maine, Maryland, Mass., N. H., N. J., N. Y., Pa., R. I., Vt., W. Va.,: and USDA

NE-23

Breeding of Small Grains for Resistance to the Hazards of Production in the Northeastern States. To: (1) develop high yielding stiff-strawed varieties of small grains, resistant to major diseases and insect pests, which possess desirable agronomic and quality characteristics suitable for the region; (2) obtain fundamental knowledge of diseases and their causal agents; of insects; of the factors that influence winter hardiness, resistance to lodging, and other agronomic characters of importance in grain production; in order to develop efficient breeding programs and control methods to reduce crop losses.

Cooperating stations and agencies: Maine, Md., N. J., N. Y. (Cornell), Pa., W. Va.: and USDA

S-9

The Introduction, Multiplication, and Evaluation of New Plants for Industrial and Agricultural Use and the Preservation of Valuable Germ Plasm. To: (1) cooperate in a coordinated program of foreign and domestic plant exploration and introduction; (2) multiply, evaluate and maintain introduced materials adapted to the Southern Region; (3) catalog and distribute introduced plant materials and maintain records of their use in the region; (4) maintain and preserve germ plasm of field and horticultural crops of economic value; and (5) coordinate these programs with similar programs in other regions.

Cooperating stations: Ark., Fla., Ga., Ky., Miss., N. C., Okla., P. R., S. C., Tenn.

SM-11

Marketing and Utilization of Grain in the South.

To: (1) determine the present system of receiving, handling, storing, distributing, and utilizing grain in the South, and (2) estimate the present and potential demands for grain in the South and to evaluate the adequacy of the marketing system to meet the present and potential demand

Cooperating stations and agencies: Ark., Ga., Miss., N. C., Tex.; and USDA

WM-6

The Introduction, Multiplication, Preservation and Determination of the Potential Value of New Plants for Industrial and Other Purposes.

To: (1) cooperate in a coordinated program of plant explorations both foreign and domestic to obtain plant materials and to determine their potential value for industrial and other purposes; (2) establish and maintain a Regional Plant Introduction Station and secondary stations if desired; (3) initiate a program of cataloging, preserving, multiplying, distributing, and reporting performance of introduced and domestic seed and plant materials of potential value in the region; (4) maintain and preserve the germ plasm of field and horticultural plants of economic value in the region; (5) coordinate the program with programs in other regions.

Cooperating stations: Ariz., Calif., Colo., Idaho, Mont., Nev., N. Mex., Oreg., T. H., Utah, Wash., Wyo.

WM-16

Maintaining Grain Marketability by Insect Control in Storage. To (1) determine the stored product insects of economic importance in the Western Region and the ecological factors responsible for their presence or abundance under both dry and humid conditions, and (2) evaluate the efficacy of grain protectants, residual sprays, and fumigants under laboratory and field conditions.

Cooperating stations and agencies: Ariz., Calif., Colo., Idaho, Oreg., Wash.; and USDA

WM-20

The Economics of Marketing Hay and Feed in the West.

To: (1) describe the movement of hay and feed concentrates between the Western Region and the rest of the United States and between states in the region with emphasis on areas of origin and destination and channels through which movement takes place; (2) describe marketing methods and mechanisms by which interstate movement of hay and feed grains, particularly corn and barley, is effected; (3) describe the role of the commercial feed mixers in interstate movement of feed concentrates; (4) analyze functions performed by the market mechanism in interstate movement to determine the costs and margins incurred in the market system and their reasonableness; (5) analyze the services rendered by the market and processing mechanisms for the interstate movement of feed concentrates to determine the costs and margins incurred and their reasonableness.

Cooperating stations: Mont., Nev., N. Mex., Wash., Wyo.

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Part 8, Sec. b

~~Administratively Confidential~~

FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

JUNE 1956

Section b

OIL, FIBER, TOBACCO AND
SUGAR CROPS

FIELD CROPS

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CURRENT SERIAL RECORDS

Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWARD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State fund supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the United States Department of Agriculture or any other governmental agency when such agencies are cooperative in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

Ala. Breeding Improved Varieties of Cotton for Alabama.
To (1) develop and maintain high yielding disease-resistant varieties of cotton with improved fiber properties and better adaptation to mechanized production, harvesting, and ginning, (2) study the inheritance of characters associated with yield and disease resistance.

Agron., Soils 103 (S-1), coop. USDA

Ala. Cotton Variety Testing. To determine (1) annually, varieties of cotton for most profitable production in Northern, Central and Southern Alabama; and (2) degree of resistance to Fusarium wilt and root-knot nematode diseases of varieties and/or strains of cotton claimed to be wilt-resistant and adapted to economic production in Alabama.

Agron., Soils 104, coop. USDA

Ala. Maintaining Soil Fertility and Crop Production on Soils Cropped with Harvested Peanuts. To (1) determine nature of soil depletion caused by continuously harvesting peanuts, (2) determine how to maintain and improve production of soils under system of harvesting peanuts, and (3) obtain information leading to establishment of more effective cropping systems.

Agron. & Soils 408

Ala. Mechanization of the Harvesting of Cotton. To evaluate and improve (1) machines and methods for preparing cotton crop of mechanized harvest; (2) machines and methods for mechanical harvesting; and (3) mechanical harvester performance in relation to plant characteristics.

Agr. Engin. 506 (S-2), coop. USDA

Ala. Control of Cotton Insects. To determine effectiveness of new insecticides against the boll weevil and other cotton insects and the effect of controlling various species upon the yield of cotton and to develop a dusting schedule for the control of the major insects attacking cotton.

Zool., Ent. 512

- Ala. Marketing of Cottonseed for Planting Purposes in Alabama. To (1) study and describe organization and operation of existing marketing structure including agencies, facilities, and legal regulations about cotton seed for planting; (2) determine practices of cotton producers in obtaining seed for planting; (3) learn adequacy of supply of planting seed in relation to demand; (4) evaluate practices of distributing agencies in marketing planting seed; and (5) learn possibilities of improving marketing system for planting seed to reducing costs and improving adequacy and availability of seed of desired quality.
Agr. Econ. 541 (SM-1), coop. USDA
- Ala. Cause and Control of Collar Rot on Peanuts. To (1) determine cause or causes of collar rot of peanuts; and (2) develop control measures.
Bot., Pl. Path. 546
- Ala. Biology and Control of Peanut Insects. To (1) make detailed life-history studies of red-necked peanutworm, and lesser cornstalk borer on peanuts; (2) determine relative and seasonal abundance of various species of soil insects injurious to peanuts, evaluate damage, and study effect of insecticides on soil insects and on yield and quality of peanuts; (3) investigate extent of damage of leaf-feeding insects to late-planted peanuts after harvest of oats or wheat, and evaluate methods and insecticidal materials for control; (4) study species involved and extent of damage done by insect pests of stored peanuts and develop control measures; and (5) determine by chemical and bioassay methods residues on peanuts and foliage resulting from use of various effective insecticides.
Zool., Ent. 553
- Ala. The Market Value of Peanuts as Affected by Changes in Chemical and Physical Properties During Storage. To learn (1) effects of storage on chemical, biochemical, and physical changes in peanuts; (2) relationship of initial quality of peanuts to changes during storage; (3) relation of microflora to respiration and associated deteriorative changes in peanuts; (4) relationship between chemical, biochemical, and physical properties and changes in odor, flavor, and certain nutritive factors affecting market value of peanuts.
Bot., Pl. Path. 570

- Ariz. Control of Phymatotrichum (Cotton or Texas) Root Rot In Irrigated Lands. To secure fundamental and practical information leading to development of control measures for Phymatotrichum root rot in irrigated lands.
Pl. Path. 42
- Ariz. A Study of the Inheritance of Fiber Qualities in Selfed Lines and Hybrids of Upland Cottons. To determine to what extent uniformity in length, strength and fineness of fiber and abundance of fiber, as determined by lint percentage, have a genetic basis.
Pl. Breeding 47, coop. USDA
- Ariz. Verticillium Wilt of Cotton. To study the complete or partial control of Vericillium wilt of cotton.
Pl. Path. 256
- Ariz. Cotton Production Under Irrigation. To (1) improve cotton cultural practices, and (2) determine influence of environmental, physiological and genetic factors on quality and industrial qualities of cotton grown in southern Arizona.
Agron., Agr. Chem., Engin. 264, coop. USDA
- Ariz. The Relationship Between the Price Received by Farmers at Gin Points and the Quality of Cotton, Central Arizona. To (1) determine efficiency of Arizona markets in reflecting premiums and discounts for quality prevailing in central markets, and in reflecting average level of prices prevailing in central markets; (2) isolate seasonal movements in Phoenix-Memphis price spread, and to explain them in terms of causal factors.
Agr. Econ. 267 (SM-1)
- Ariz. Mechanization of Cotton Production and Harvesting. To (1) increase efficiency in mechanized production of irrigated cotton by study and development of machinery and methods for improvement of seedbed preparation, planting and cultivation; (2) determine effect of various cultural treatments and harvesting procedures upon efficiency of machine harvesting machines; and (3) determine desirable plant and cotton characteristic for mechanical harvesting.
Agr. Engin., Agron. 269 (W-24), coop. USDA

Ariz. Production and Improvement of Oil Seed Crops. To (1) determine strains and varieties of castorbeans, flax, safflower, sesame and soybeans adapted to Arizona; (2) determine proper cultural practices for castorbeans, flax, safflower, sesame, and soybeans; and (3) maintain supply of foundation seed of varieties of above oil seed crops in commercial production.
Agron. 275, coop. USDA

Ariz. Breeding Cotton for Disease and Insect Resistance and for Plant Types Suitable for Mechanical Harvesting. To (1) evaluate resistance of present breeding stocks to local diseases and insects and ability for mechanical harvesting; (2) introduce stocks from other localities having similar problems; (3) cooperate in production of high yielding varieties of good spinning quality suitable for mechanical harvesting; and (4) provide adequate initial seed stocks of desirable strains for distribution to growers.
Pl. Breeding 278 (S-1), coop. USDA

Ariz. Breeding Long Staple Cotton (*Gossypium Barbadosense*) for Length, Fineness and Strength of Fiber and Improved Type of Plant with High Production. To produce a long staple cotton with medium fineness of fiber, medium length of fiber, and increased strength of fiber with a reduced size of plant with larger bolls and high yield.
Pl. Breeding 294

Ariz. Quality and Cost of Ginning Services in Central Arizona. To ascertain (1) quality of ginning services performed by ginning establishments equipped with varying amounts of cleaning and conditioning equipment; (2) comparative costs of providing ginning services using varying amounts of equipment; (3) operating practices and conditions affecting quality of ginning services performed; and (4) comparative returns to cotton producers from ginning cotton at various types gin establishments.
Agr. Econ. 321, coop. USDA

Ariz. Influence of Climatic Factors on Fiber Properties in Cotton. To learn (1) if differences occur in fiber properties of same variety of cotton grown in various climatic areas of state, (2) if climatic factor or factors which may influence fiber property variation between areas as well as year to year variation at same time.

Agron., Range Management 380, coop. USDA

Ariz. The Biology and Control of Insects Affecting Cotton in Arizona. To include (1) ecological studies of cotton insects; (2) life history studies; (3) chemical control studies; and (4) miscellaneous studies, e.g., existing information would be assembled, field infestations would be studied and types of injury to marketed product would be investigated.

Ent., Agron. 383, coop. USDA

Ariz. The Effects of Fires on Cotton Ginning Costs and Possible Means of Reducing Fire Losses in Arizona. To learn (1) causes and extent of fires occurring in cotton in transit from producer to gin, in gins and in gin baleyards; (2) effectiveness of various fire preventive devices current in state, and evaluate results in terms of effects on ginning costs; (3) structures of and trends in transit, processing, and baleyard insurance available in Arizona.

Agr. Econ. 392 (SM-17), coop. USDA

Ark. Cotton Breeding, Genetics, and Improvement. To (1) develop by use of modern plant breeding and accessory techniques new general purpose cotton strains which are superior to existing varieties; particular emphasis being given to yield, suitable staple length and uniformity, lint percentage, lint strength, structure and proper degree of fineness, boll size, resistance to important diseases, better manufacturing behavior, and general adaptational characteristics required in several cotton growing sections of the state; (2) develop special purpose high quality strains for mechanical picking or stripping and best degree of cleaning and processing at gin; (3) study parent material from suitable sources and its hybrid relationships with present available material; and (4) study inheritance of plant and fruit characters and groups of these as they affect singly or in combination, cultural adaption, growth response, production, and lint and seed qualities in the crop.

Agron. 122

- Ark. Ecology and Control of Aphids. To study physical, chemical and biological factors affecting abundance of spinach aphid, turnip aphid, pea aphid, greenbug, and cotton aphid, including effect on populations of sub-lethal applications of insecticides, and effectiveness of various new and standard insecticides in control to be determined in conjunction with the ecological study, with emphasis on control at low temperatures.
Ent. 186
- Ark. A Study of the Etiology and Control of Seedling Blights and Boll Rots of Cotton in Arkansas. To determine (1) the principal causes of seedling blights and boll rots; (2) whether carried on the seed, soil, or compost; (3) nature of resistance and susceptibility; (4) environmental relationships; and (5) efficacy of seed treatments, use of resistant varieties, soil management, and other controls.
Pl. Path. 225
- Ark. Profitable Enterprise Combinations on Cotton Farms. To (1) determine physical and economic input and output data for various enterprises adapted to cotton-type farms; (2) determine returns to different types and intensities of alternative enterprises; and (3) evaluate effect of various enterprise combinations on farm business as a whole on the most important cotton-type farms.
Rur. Econ. & Sociol. 330, coop. USDA
- Ark. Improvement of Timing of Insecticidal Applications for Cotton Insect Control. To determine (1) relation of protection of earliest squares from insect injury to total yield of cotton lint; (2) interval of time between applications of different insecticides used in cotton insect control appears to vary, and also determine the optimum interval and the relation of other factors that may modify or govern optimum interval between applications for each insecticide; and (3) extent of possibilities of delay or prevention of boll weevil migration from early infested spots, by boll weevil control.
Ent. 333

Ark.

Etiology and Control of the Verticillium Wilt of Cotton in Arkansas. To (1) make a thorough study of morphology and physiology of the pathogen of Verticillium wilt disease of cotton especially from point of view of its pathogenicity under varying climatic and nutritional conditions and to study possibility of biological strains together with the possibility that there are variations arising from an unrecognized sexual process; (2) study reaction of the pathogen to various types of commercial and wild cotton and determine nature of resistance displayed by some of them, and to a limited extent, by ordinary cotton strains, to this disease; (3) measure by lab, greenhouse and field plot methods degree of resistance of all available selections of upland cotton and other possible breeding material with a view to providing basic material to be used in cotton breeding program to develop suitable commercial cotton varieties for use in Arkansas and other similar areas; (4) determine environmental conditions which modify severity of outbreaks of Verticillium wilt of cotton; and (5) devise methods of controlling or ameliorating severity of attacks of disease thru soil amendments, improved cultural methods, rotation, control of soil insects, nematodes, etc. and thru use of soil fumigants and fungicides.

Pl. Path., Agron. 334

Ark.

Marketing of Cottonseed for Planting Purposes. To determine and evaluate (1) practices of cotton producers in obtaining planting seed; (2) practices of distributing agencies in marketing cotton seed; (3) adequacy of supplies of seed of satisfactory quality in relation to demand; (4) risks and costs borne by cotton breeders and other agencies engaged in distribution of cotton seed; and (5) possibilities for improving marketing system with the view to reducing costs to producers and improving quality and adequacy of supplies of such seed.

Rur. Econ. & Sociol. 346 (SM 1)

- Ark. Cotton Genetics: The Inheritance of Boll Size, Lint Percentage, and Other Economic Characters in Cotton. To (1) establish mode of inheritance of economic characters in cotton; and (2) evaluate with respect to genetic linkages and/or environmental correlation, the apparent antagonistic association between long fibers and high lint percentage, high strength and high yield, earliness and good fiber quality, and other associations of characters that may be found.
Agron. 358 (S-1)
- Ark. Cotton Breeding and Genetics: The Development of Cotton Varieties Having Good Agronomic Properties and Resistance to Verticillium Wilt. To (1) develop breeding stocks of cotton resistant to Verticillium wilt; (2) determine how resistance factor, when discovered, is inherited and how it can be transferred to varieties of commercial importance; and (3) screen advanced breeding lines developed by the station breeder with respect to Verticillium wilt reactions.
Agron., Pl. Path. 359
- Ark. Rotation and Fertilizer Experiments for Cotton Production on Heavy Delta Soils. To study various crop rotations and fertilizer treatments for cotton production on heavy-textured soils (Sharkey series) of Eastern Arkansas.
Agron. 365
- Ark. Ecology and Control of Pink Bollworm. To (1) learn probable future importance of the pink bollworm as a pest of cotton, and (2) develop satisfactory control measures applicable to Arkansas agricultural practices and climatic conditions.
Ent. 367, coop. USDA
- Ark. An Evaluation of Cost and Quality of Ginning Services in the Delta Sections of Arkansas. To ascertain (1) quality of ginning services performed by ginning establishments equipped with adequate amounts of cleaning and conditioning equipment for handling machine-picked cotton; (2) cost of providing such services; (3) operating practices and conditions affecting quality of ginning services performed; and (4) comparative advantages to cotton producers from ginning machine-picked and hand-picked cotton at gins using various basic types of lint cleaners.
Agron., Agr. Engin. 385

Ark. Effects of Price Support, Acreage Adjustment and Surplus Removal Programs for Cotton Upon Arkansas Agriculture. To (1) analyze and appraise effects of Federal price support, acreage adjustment and surplus removal programs upon the supply, domestic and foreign consumption, markets, and prices, and gross income from cotton lint; (2) analyze and appraise effects of cotton programs in terms of concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for cotton; and (3) study interconnections of programs for cotton with other programs, either farm commodities or farm practices important in Arkansas and the South, and examine their interactions.
 Rur. Econ. & Sociol. 387 (SM-14)

Ark. Etiology and Control of Certain Soil-Borne Diseases of Cotton. To learn what etiological factors are associated with destructive incidence of Fusarium wilt-root knot complex and devise or improve methods for its control thru varietal resistance, soil fumigation, green manuring, better methods of culture and improved fertilization techniques.
 Pl. Path. 394

Ark. Engineering Aspects of the Mechanization of Cotton Production and Harvesting in Arkansas. To design and improve machines and develop methods which will reduce manpower needs to a minimum and increase output per laborer to a maximum with respect to the following phases connected with growing of cotton: (1) seedbed preparation, (2) weed control, (3) evaluating and improving machines for preparing the cotton crop for harvest, and (4) evaluating mechanical harvester performance in relation to plant characteristics.
 Agr. Engin. 395 (S-2)

Ark. A Study of Factors Affecting Germination and Seedling Growth of Cotton at Low Temperatures. To study (1) effects of temperature on basic germination processes and growth of cotton, (2) devise methods of increasing cold tolerance in seedling cotton.
 Agron. 405, coop. USDA

Ark. A Study of Factors Affecting the Fruiting Behavior of Cotton. To (1) investigate factors affecting fruiting habits of cotton: e.g., initiation, intensity, fruiting pattern, cutout; (2) use obtained information to tailor growth of plant that maximum yields may be secured from available soil and climatic resources.
Agron. 406, coop. USDA

Ark. Physiological Effects of Selected Herbicides on Cotton, Soybeans, and Noxious Weeds. Establish maximal limits of certain herbicides for cotton and soybeans, and minimal requirements for control of noxious weeds, as may be influenced by age of plants and environmental conditions. Learn degree to which varieties within a given species differ in their tolerance to any given herbicide and learn cause of differences. Investigate mechanism by which herbicides kill plants.
Agron. 408 (S-18)

Ark. The Influence of Cultural Practice Combinations on the Yield and Quality of Cotton. To (1) learn influence of combining recommended cultural practices on yield and quality of cotton produced; (2) find ways of increasing efficiency of production with emphasis on acceptable yields on a shortened land use time and on higher yields utilizing full growing season; (3) learn better ways of using hairy vetch and crimson clover with cotton planting practices; (4) determine a "stand" of cotton under different fertility levels and planting dates; (5) learn effects of varying cultural practice combinations on quality of lint produced.
Agron., Agr. Engin. 413

Calif. Insect Vectors and Plant Virus Diseases: A. Curly Top in Sugar Beets and Other Host Plants. To (1) make periodic surveys of beet leafhopper populations and incidence of curly top virus to keep informed of status of this threat to growth of certain crops, (2) identify curly top virus on its various hosts when submitted by growers so they will be aware of the problem, (3) investigate species of leafhoppers on pasture vegetation and perennials in plains and foothills to find other vectors of curly top virus, and (4) make life history studies of beet leafhopper under natural conditions to determine number of generations, especially in summer and number of broods.
Ent., Para. 657-A

- Calif. Chemical Weed Control on Cotton. To develop (1) satisfactory programs of weed control in cotton culture, by controlling annual and perennial weeds in cotton fields and by controlling similar weeds in nearby areas that act as weed seed reservoirs; and (2) comparative programs in other row crops, using as a basic source of information the results obtained from investigations in cotton.
Bot. 1568, coop. USDA
- Calif. Factors Affecting the Abscission Process in Relation to Defoliation in Cotton. To learn of the physiological factors affecting abscission and to develop more reliable and efficient methods of defoliating cotton.
Bot., Agron., Soils, Engin. 1581, coop. USDA
- Calif. Study of the Basic Factors Influencing the Development of Strains or Types of Cotton Resistant to Verticillium Wilt. To learn (1) influence of moisture, temperature and nutrition to infection by verticillium wilt fungus and development of disease in cotton, (2) infection court and progression of fungus in plant in relation to symptoms, (3) different strains of fungus as they are related to development of resistant cotton, (4) source of resistance and study inheritance of resistance.
Field Crops, Pl. Path. 1651, coop. USDA
- Calif. Development, Improvement, and Testing of Mechanical Equipment for the Production of Cotton. To reduce labor and costs and improve yield and quality by use of stock shredders, planters, fertilizers, cultivators, sprayers, dusters, topping machines, and harvesters as well as cultural practices.
Agr. Econ., Agron. 1677 (W-24), coop. USDA
- Colo. The Effects of Previous Cropping Practices on the Incidence of Root Diseases of Sugar Beets. To learn (1) effects of previous cropping practices on development or suppression of said diseases, (2) effect of crop residue on soil microbiological populations, (3) value of control measures for pre- and post-emergence damping-off with application of crop residues to soil at time of planting.
Pl. Path., Agron. 231 (W-38)

Colo. Utilization of Labor in the Production of Sugar Beets, Northeast Colorado. (1-10 learn) (1) month-by-month patterns of labor for family workers--regular and seasonal workers; (2) how patterns vary with extent of mechanization of thinning, hoeing, and harvesting; (3) shift in labor use resulting from mechanization; (4) length and seasonality of shifts for family and workers; (5) how patterns of labor use vary with size of operation, tenure, etc.; (6) changes in types of hired workers used in mechanized and nonmechanized methods; (7) labor supply and recruitment problems for skilled and unskilled; (8) changing role of sugar beet companies, grower associations, public agencies, etc., in recruitment; (9) changes in labor thru use of sugar beet factory records, and employment service records, (10) general changes in labor use from comparison with surveys of previous years and with less mechanization; (11) appraise impact of changes on financial structure of irrigated farms.

Agr. Econ., Agron. 97, coop. USDA

Conn. Chemical Appraisal of the Market Grades of Tobacco and of the Changes that Occur in the Curing and Fermentation Processes. To establish objective methods of defining quality of tobacco used for wrappers and binder; to extend previous basic research in chemistry of curing tobacco; to reduce these results to practice in the marketing of tobacco.

Biochem. 204

Conn. Enzyme Catalyzed Changes in the Curing of Tobacco and the Relation of these Changes to Quality and Thus to Market Value. (1) Study enzymatic reactions occurring in green leaves, to isolate and purify enzymes bringing about these reactions, and to study the role enzymes play in metabolism of the leaf.

Biochem. 205

Conn. Curing and Fermentation of Cigar Wrapper and Binder Tobacco. To determine which chemical reactions in curing and fermentation processes lead to high quality in cigar tobacco and to promote these reactions by controlled curing and fermentation so as to produce leaves of higher and more uniform quality.

Pl. Path., Bot., Biochem. 646

Conn. "Open Shade" Tobacco. To produce an open grown tobacco leaf with the quality for cigar wrappers of present shade tobacco.

Pl. Path., Bot. 647

Conn. Components of Cigar Tobacco Leaf Contributing to Market Quality. To (1) learn compounds in cigar binder and wrapper leaf that contribute to flavor, aroma, color, and other properties affecting consumer demand, and (2) study manner in which these compounds arise, how quantity can be altered, and how they can be removed from or added to tobacco at various stages of processing.

Pl. Path., Bot. 651

Conn. Effect of Soil Properties on the Yield and Quality of Tobacco Grown Under Irrigation. To learn (1) interrelation of irrigation, soil type, physical soil condition, fertilization, row spacing, kind of tobacco, and nature of tobacco root system on yield and quality of tobacco; (2) effect of deepening effective tobacco root zone (by loosening and fertilizing subsoil) on more efficient use of water applied by irrigation in increasing yield and quality of tobacco.

Soils, Pl. Path. 724 (NE-22)

Conn.
(Storrs) Competitive Market-Grade Pricing of Cigar Tobacco Types Suitable for Binder Use. To develop information and analyses for interpreting competitive pricing of identifiable qualities and market-grades of cigar tobacco types suitable for binder use.

Agr. Econ., Agron. ES 320, coop. USDA

Fla. Peanut Breeding for Superior Types for Market and For Livestock Feed. To develop (1) superior market varieties having seed qualities of Spanish, N. C. Runner, and Virginia Jumbo peanuts; and (2) superior varieties for livestock feed with good qualities for hogging-off.

Agron. 20

Fla. Flue-Cured Tobacco Improvement. To develop varieties of flue-cured tobacco of good type and yield combined with resistance to nematodes and other pests.

Agron. 372

- Fla. Nutrition and Physiology of the Peanut. To determine the growth requirements and study the physiology of peanuts as a basis for increasing yield and quality.
Agron. 488
- Fla. Fertilization and Culture of Flue-Cured Tobacco. To determine the influence of fertilization, irrigation, and soil fumigation on flue-cured tobacco.
Agr. Engin., Agron 555
- Fla. Herbicidal Control of Weeds in Peanuts and Oats. To evaluate effectiveness and economy of herbicides for weed control in peanuts and oats.
Agron 694 (S-1S)
- Ga. Cotton Breeding. To develop (1) a high yielding cotton with a staple of 1 inch or longer which is wilt resistant and (2) new strains or varieties having superior qualities of disease and insect resistance, earliness, and yielding ability combined with special foliage branching, and picking qualities needed to meet the requirements of mechanized farming.
Crops, Agron. 2, coop. USDA
- Ga. Efficient Marketing of Peanuts. To discover inefficiencies in marketing farmers' stock peanuts at country points and to devise and test means of improving efficiency.
Agr. Econ. ES 3, RM:c-703
- Ga. Mechanization of Cotton Production. To improve (1) methods of disposal of cover crops and crop residues, (2) machinery for planting cotton in trashy soil, and (3) methods of controlling weeds in cotton, including cost reduction.
Agr. Engin. 3 (S-2), coop. USDA
- Ga. Effects of Rates, Kinds, and Fineness of Liming Materials on Yield, Quality, and Mineral Nutrition of Important Georgia Crops. To (1) determine effect of various liming materials on yield, chemical composition, and nutritive value of alfalfa, cotton and Bermuda-clover pastures; (2) determine rate per acre and frequency of application most suitable, and (3) study effect of lime on uptake of other plant nutrients.
Agron. 8

- Ga. Factors Affecting the Germination of Cotton and Winter Legume Seed. To find the optimum conditions for the germination of seeds both under field and laboratory conditions and to determine the effects of various conditions, such as fertilizers, soil preparation, diseases, moisture, temperature, and varieties, both singly and in combination, upon the germination of seed and growth of seedlings.
Agron., Crops 10

- Ga. Peanut Proteins.--1. Amino Acids in Peanut Proteins and Improvement in Methods for Their Determination. To determine the amino acids in peanut proteins and simplify and increase precision of present methods of amino acid determination.
Chem. 14-1

- Ga. Peanut Curing. To determine effect of (1) various curing methods upon quality and yield of peanuts for seed stock, edible trade, and oil and (2) high temperatures on edible qualities and viability of peanuts; (3) to devise methods of curing to reduce labor costs and improve the quality of peanuts.
Agr. Engin., Bot., Chem. 15, coop. USDA

- Ga. Roasting Peanuts. To study chemistry of the process of roasting peanuts and determine effect of variations in the process on the resulting product.
Chem. 16

- Ga. Marketing of Cottonseed for Planting Purposes in Georgia. To (1) study and describe organization and operation of existing seed marketing structure including organizations, agencies, facilities, and legal regulations pertaining to cotton planting seed; (2) determine and evaluate practices followed by producers in obtaining cotton planting seed; (3) determine adequacy of supplies of planting seed of satisfactory quality in relation to demand; (4) evaluate practices of distribution agencies in marketing cotton planting seed; and (5) determine possibilities for improving marketing system for cotton planting seed with the view to reducing costs to producers and improving quality and adequacy of available supplies of such seed.
Agr. Econ. 19 (SM-1), coop. USDA

- Ga. Breeding, Culture, and Fertilization of Soybeans in Georgia. To (1) develop disease resistant varieties of soybeans that can be profitably grown in Georgia for these uses: for hay that will give good forage yields and abundant seed, for hogging-off with low oil content that hold seed well and produce high seed yields, and for edible varieties that will make suitable green vegetable beans or dry beans; (2) determine environmental factors which prevent seed setting and development of varieties resistant to these factors; and (3) determine effect of lime and fertilizer nutrients on yield of seed and hay, and on oil content.
Agron. 32, coop. USDA
- Ga. - The Use of Chemicals for Weed Control and Defoliation of Crop Plants. To determine (1) most economical method to control weeds in cultivated crops; (2) most satisfactory and economical method to control weeds in small grain and sod crops; and (3) effectiveness of materials used for defoliation of cotton and other crops and what effect chemicals have on quality and quantity of crops harvested.
Agron. 34, coop. USDA
- Ga. Susceptibility of Various Strains of Spanish Peanuts to Rancidity Development. To (1) determine susceptibility of various strains of Spanish Peanuts to oxidative rancidity development, and select less susceptible strains for production of this type; and (2) isolate and characterize factor or factors that are responsible for the difference in susceptibility of various types to oxidative rancidity development.
Chem., Pl. Path., Pl. Br. 43-1
- Ga. The Effect of Fertilizer Ratios and Methods of Placement on Peanut Yields. To (1) determine most profitable ratios and rates of fertilizers for use on peanuts, (2) determine optimum placement of peanut fertilizers, and (3) develop satisfactory equipment for optimum fertilizer placement when determined.
Agr. Engin. 49, coop. USDA
- Ga. Upland Cotton Breeding for Coastal Plain Conditions. To (1) develop high yielding cottons adapted to Coastal Plain area which possess superior fiber qualities, with emphasis on high fiber strength with acceptable levels of yield and other fiber characteristics, and to screen selected lines for resistance to fusarium wilt; and (2) study methods of preventing damage to seeds and fibers due to high rainfall and high humidity conditions at harvest.
Agron. 51, coop. USDA

- Ga. Control of Insects Attacking Peanuts and Tobacco.
To develop effective methods to: (1) reduce damage done to peanuts by insects feeding on foliage and on roots and nuts; and (2) determine regular spray and dust schedules for control of budworm, hornworm, and green peach aphid on tobacco.
Ent., Agron. 53
- Ga. Control of Southern Blight (*Sclerotium Rolfsii*) on Peanuts. To develop (1) well integrated practicable schemes of culture that apply the fundamental requirements for control of southern blight on peanuts and other crops; and (2) implements which will obtain these cultural requirements in widely different types of soil.
Pl. Path., Agr. Engin., Hort., Agron. 68, coop. USDA
- Ga. - Effects of Governmental Price and Income Policy Upon Georgia Cotton Producers. To analyze and appraise the effects of the cotton programs in terms of concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for cotton.
Agr. Econ. 70 (SM-14)
- Ga. The Effect of Different Moisture Levels on Rates of Evapotranspiration from Row Crops in the Piedmont of Georgia. Learn (1) response of cotton to 3 soil moisture regimes under completely adequate and normal fertilization, (2) rate of evapotranspiration from cotton grown with irrigation.
Agr. Engin., Agron. 98 (S-24), coop. USDA
- Ga. Peanut Breeding and Improvement. Develop high yielding, disease resistant varieties of peanuts; conduct basic studies in inheritance of characters of economic importance, involving genetic studies of peanut and related species, inter- and intra-specific hybridization and cytogenetic investigations of breeding materials; evolve improved production practices in collaboration with specialists in various phases of peanut production research.
Agron., Pl. Path. 101, coop. USDA
- Ga. An Economic Analysis of Effects of Fires on Insurance and Other Costs at Gins. Reduce fire insurance cost to ginners. Learn (1) effect of prevention devices and practices on frequency and extent of fires and cost, (2) relation of premiums for gin fire insurance to losses, (3) trends in types of and rates for insurance to ginners, (4) legal limitations and regulations of fire insurance companies.
Agr. Econ., Agron. 102, coop. USDA

Ga. Irrigation Practices for Flue-Cured Tobacco. Learn amount and frequency of application of supplemental irrigation required for optimum yields and for efficient production of flue-cured tobacco under high rates of fertilization. Express findings in terms of soil moisture tension, stages of plant growth, and frequency and depth of irrigation to permit wide application of results.

Agr. Engin., Agron. 111 (S-24)

Ga. Costs and Innovations in Marketing Flue Cured Tobacco. To (1) determine cost of marketing flue cured tobacco, (2) evaluate technological innovations which might lower costs and contribute to a more serviceable market facility, and (3) ascertain needed adjustments in length of marketing season and other customs and habits in the marketing arrangement.

Agr. Econ., Agron., ES 337

Idaho Irrigation Practices for Beets in Southeastern Idaho. To determine (1) optimum soil moisture level for first irrigation of beets; (2) optimum frequency for irrigation of beets; and (3) effect of above irrigation treatments on yields, sugar contents, and top-root ratio.

Agr. Engin. 177

Ill. The Marketing System for Soybeans and Soybean Products and the Marketing for Soybean Oil. To (1) determine and describe the precise manner in which prices of soybeans are determined and influence of technicalities of marketing system on soybean prices; (2) determine nature of expectation, manner of their formation, and their influence on soybean prices; (3) determine competitive position of soybean oil among edible and technical vegetable oils and factors affecting users' acceptance of various oils; and (4) examine world trade in edible oils and oilseeds and factors in world price structure for these.

Agr. Econ. 05-354

Ill. Spatial Differences in Soybean Prices. (1) Describe differences in and changes in differences in price of soybeans at various major locations in United States. (2) Learn factors affecting spatial differences in price.

Agr. Econ., Agron. 05-357

- III. The Effect of Feeding the Soybean Plant or its Fractions on Animal Reproduction, Growth, Lactation, and Aging. To (1) learn cause for impaired reproduction and other physiological failures in female rabbit fed a diet composed of 49.5 parts soybean hay, 49.5 parts of ground wheat and 1 part NaCl; (2) extend study to dairy cattle and goats to learn reasons why soybean forage as a nutrient source has lost favor with dairymen in Illinois; (3) study soybean dietary factors as related to vitamins, hormones, and body metabolism.
Dairy Sci. 35-312
- III. Soybeans and Soybean Products as Human Food. To investigate desirability of soybeans and their products for human consumption, study suitability of different varieties for cooking and processing and determine chemical constituents of soybeans so as to ascertain why they differ in culinary qualities from other legumes and if treatment of beans might be modified to make them more acceptable.
Home Econ. 60-324
- III. Structural Relations of Supply, Market Outlets, and Price for Fats and Oils of Animal and Vegetable Origin. To determine structure of dynamic relationships between supply, market outlets, and price for animal and vegetable fats.
Agr. Econ. 474, ES-18, RM:c-701
- Ind. The Occurrence and Inheritance of Linolenic Acid in Soybeans and its Relationship to Other Fatty Acids. To (1) develop techniques and methods for rapid and accurate evaluation of fatty acids, especially linolenic acid in soybean oil; (2) learn range of fatty acid composition, especially linolenic acid, of foreign introductions of soybeans; (3) learn mode of inheritance of linolenic acid content of soybeans; and (4) develop strains of soybeans low in linolenic acid content which can be used in development of commercial varieties.
Agron., Biochem. 719, coop. USDA

Iowa

Development of Superior Soybean Strains. To (1) develop new soybean varieties adapted to the various climatic and edaphic conditions in Iowa and superior to those now grown in respect to yield and other agronomic characters, in chemical composition, and in resistance to the major diseases, (2) cooperate with Regional Soybean Lab. FCRB, USDA, in regional testing of soybean varieties developed in other states in this region, (3) determine value of different breeding methods in soybean improvement and to develop more effective methods of selection, (4) obtain basic data on the inheritance of and nature of gene action conditioning the expression of agronomic characters, chemical composition, and disease resistance, (5) determine the nature of host-parasite relationships for each of the major soybean diseases, (6) evaluate the disease reaction of breeding material developed in this program and such other sources of germ plasm as may be of potential value in soybean improvement, and (7) determine factors that influence the development of soybean diseases including mode of transmission and establishment in the host and the effect of environmental factors on establishment and development of the disease infection.

Agron., Bot. 1179, coop. USDA

Kans.

Breeding and Production of Soybeans, Sweet Clover, and Special Crops. To (1) obtain by breeding, selection and testing more satisfactory varieties of soybeans for yield, content, and quality of oil, and adaptability to combine harvesting; (2) study cultural practices for sweet clover such as effect of clipping or pasturing upon root development and subsequent yield; and (3) test special crops for adaptability and value for growing in this section, and test methods of production.

Agron. 241 (NC-11), coop. USDA

Ky. Interrelationships Between Prices of Different Grades of Burley Tobacco. To analyze relationships between prices of different grades of burley tobacco, note trends in these relationships, and if possible, establish "normal" interrelationships between prices of the various grades.

Mkts. & Rur. Fin. 12

Ky. Cooperative Marketing of Tobacco in Kentucky. To study the factors affecting the success and failure of tobacco pools in Kentucky.

Mkts. & Rur. Fin. 17

Ky. Demand Interrelationships Between Burley and Selected Other Types of Tobacco. To (1) define and qualify, insofar as possible, the factors influencing the demand for burley, flue-cured and Maryland tobaccos; (2) derive statistical demand curves for each of above types of tobacco; (3) define types of interrelationships existing between demands for burley, flue-cured and Maryland types, and (4) analyze and evaluate agricultural policy implications of results obtained.

Mkts. & Rur. Fin. 19

Ky. The Market Potential for U. S. Tobaccos in Spain. Analyze market potential for U. S. tobaccos in Spain and appraise courses of action most likely to bring about increased exports of U. S. tobaccos to Spain.

Agr. Econ. 23, coop. USDA

Ky. Factors Affecting the Dispersion in Prices of Tobacco of the Same Grade at Auction Markets. To determine the effect of various factors upon the price of individual baskets of tobacco of like grade and to discover ways of reducing undue variation in price from one similar quality basket to another. Such factors for study will include: (1) intensity of light on tobacco when sold; (2) speed of sales; (3) physical and mental alertness of participants in sale; (4) number of persons participating in the auction; (5) distribution of purchasers buying directly for tobacco companies, on order for tobacco companies, for speculation and the like; and (6) other factors that relate to sale price which may be discovered as the project develops.

Mkts. & Rur. Fin. 24

Ky.

Efficiency of Labor and Equipment in Handling Tobacco on Loose-Leaf Warehouse Floors. To discover ways of saving labor in the physical handling of tobacco received, sold, and loaded out by loose-leaf tobacco warehouses. More specifically, (1) to develop ways of organizing the crew for more efficient operation, (2) to devise mechanical equipment which may simplify or speed up the work, and (3) discover the amount and arrangement of unloading space, of scales, of sales space, etc. which seems most effective in handling tobacco for sale for auction.

Mkts. & Rur. Fin. 25

Ky.

Effects of the Price Support, Acreage Adjustment and Surplus Removal Programs in Dark Tobacco Upon Kentucky's Agriculture. To (1) measure and appraise effects of Federal price support, acreage adjustment, and surplus removal programs upon supply, domestic and foreign consumption, markets and prices, and gross incomes for dark tobacco, particularly as these aspects pertain to Kentucky's agriculture; (2) measure and appraise effects of program for dark tobacco in terms of concurrent changes in farm enterprise combinations, marketing system, and interrelationships among product and factor prices for dark tobacco; and (3) study interconnections of federal program for dark tobacco with programs for other farm commodities important in Kentucky's agriculture, and to examine interaction of effects of such programs.

Agr. Econ. 37 (SM-14)

Ky.

Study of Fuels and Equipment for Curing Burley Tobacco. To determine what fuels and equipment may be used economically to obtain a high quality cure in burley tobacco.

Agron. 58

Ky.

Virus Diseases of Forage Legumes. To determine (1) prevalency, distribution, and identification of virus diseases of forage legumes; (2) host range and relation of these viruses to diseases of other economic crops, such as tobacco and vegetables; (3) properties of these viruses and methods to identify and classify them; (4) influence of these viruses on growth, longevity, and economic value of their hosts; and (5) devise methods of control, including search for resistant breeding stocks.

Agron. 59

Ky. Breeding Studies with Tobacco. To (1) develop tobacco varieties resistant to black root rot, mosaic, brown root rot, fusarium wilt, angular leaf spot, wildfire, streak virus, and black shank, (2) improve smoking qualities of burley tobacco by crossing with Turkish tobacco and selecting for aromatic strains, and (3) develop smoking tobaccos of satisfactory quality that are extremely low in nicotine content, and other strains having a maximum total alkaloid content of about 2.5 percent.

Agron. 151

Ky. The Effect of Cropping and Soil Management Practices on Yield and Quality of Burley Tobacco. To determine effect of cropping, fertilizing, manuring, liming, etc. on yield and quality of the cured leaf of burley.

Agron. 153

Ky. Virus Diseases of Tobacco. To study the virus that causes streak of tobacco to determine: (1) natural method of spread of the virus, (2) natural host range of the virus, and (3) properties of the virus.

Agron. 154

Ky. A Study of the Physical and Chemical Properties of Burley Tobacco. To determine physical and chemical properties of burley tobacco as affected by soil conditions, fertilization, methods of culture and curing, and varieties and to relate these properties to market grade and to specific use value.

Agron. 163

Ky. Control of Subterranean Insect Pests of Tobacco Plants. To determine phytotoxicity, possible stimulating effect, method of application, as well as the insecticidal action of some of the new organic insecticides for the control of wireworms, cutworms, and white grubs.

Ent., Bot. 451

Ky. Biology and Control of Grasshoppers. To (1) develop and evaluate sprays and dusts as substitutes for poison bait as a control measure for grasshoppers on forage crops and tobacco, (2) forecast in what areas grasshopper damage may occur by making fall surveys of egg abundance, and (3) study biology and species distribution of grasshoppers in relation to outbreaks of blister beetles.

Ent., Bot. 457

Ky. Control of the Green Peach Aphid, Myzus Persicae (Sulz.), on Burley and Dark Tobacco. To determine the relative effectiveness of new organic insecticides or combinations of insecticides in control of green peach aphid on tobacco.

Ent., Agron. 460

Ky. The Development and Use of Chemical Standards of Quality for Marketing Burley Tobacco. (1) Develop methods of analysis and sampling procedures for chemical constituents associated with quality of burley tobacco, and (2) test feasibility of methods in marketing burley tobacco.

Agron., Agr. Econ. 1003

Ia. Soybean Breeding. To develop varieties of soybeans which are particularly well adapted for the production of seed, forage and soil improvement under varying soil and climatic conditions in Louisiana.

Crops, Soils 134, coop. USDA

Ia. Cotton Breeding and Genetics. To develop varieties of cotton for Louisiana which are better adapted to the climatic and soil conditions than present-day varieties.

Agron. 204, coop. USDA

Ia. A Study of a Species of Pythium in its Action on Sugar Cane. To be studied by growing corn and cane under different conditions of temperature, moisture and acid, with Pythium both absent and present, by inoculating roots with Pythium and sectioning and by isolating antibiotic organisms from various soils.

Pl. Path. 205

- Ia. A Study of the Deficiencies of Agricultural Implements Applied to Sugar Cane Culture. To (1) determine economical and practical method of preparing land including flush plowing, cut crowning and ditch bank pull-in, etc.; (2) determine economical method of cultivation, and grass and weed control in sugar cane; (3) improve existing cultivation machines, or develop new ones embodying above principles; (4) develop new equipment and test present equipment for handling fertilizers, especially those handled under pressure; (5) test to adapt present available commercial stalk shredders or choppers, or develop new machines to shred cane trash after harvest; and (6) study row spacing of 44, 57, and 72" under flat and ridge cultivation.
Agr. Engin. 211, coop. USDA

- Ia. Sugar Cane.--I. To Develop New Varieties of Sugar Cane. To develop through the breeding of pedigreed sugar cane new varieties and strains which will improve yields per acre.
Sugar Cane 370, coop. USDA

- Ia. Oat Breeding. To develop varieties of oats which are particularly well adapted to different soil and climatic areas of Louisiana.
Crops, Soil 373 (S-13), coop. USDA

- Ia. A Study of Insects, Mites, and Nematodes Destructive to Cotton and the Development of Economical Means for Controlling Them. To study insects, mites, and nematodes which infest cotton, determine economic importance of the pests, and develop satisfactory and economical methods of control.
Ent., Agron., Bot., Chem. 465

Ia.

A Study of the Marketing of Cotton and Cottonseed and the Economics of Cotton Gin Operation in Louisiana. To (1) analyze economic position of the cotton ginning industry in Louisiana and determine relationship between ginning rates and services performed; factors influencing cost of ginning; and ways in which this cost might be reduced in order to serve cotton producers more efficiently; (2) study methods of marketing cottonseed in Louisiana in order to determine its effectiveness in serving the needs of the cotton producers and others, in particular seeking information on effectiveness of competition in purchase of cottonseed, relationship between price of cottonseed and various stages of marketing and price of products made from the seed, etc.; (3) analyze methods of marketing cotton in order to determine adequacy of market news information, to explore opportunities of new marketing methods, and to encourage use by producers of available marketing aids in marketing their crops; and (4) estimate, in cooperation with Cotton Branch of FMA, the grade and staple length of cotton produced in Louisiana and to work in cooperation with them in carrying out provision of Smith-Doxey Act and other related programs.

Agr. Econ. 467

Ia.

A Study of the Genetic Factors Involved in Yield Potential and Fiber Deterioration. To (1) study genetic factors responsible for yield and vigor in American upland cotton, (2) investigate possibility of additional genes or blocks of genes affecting yield attributes from other species and genetic types, and (3) study fiber deterioration under varying natural environmental conditions.

Crops and Soils 557 (S-1), coop. USDA

Ia.

Regional Marketing of Cotton, Cottonseed and Cottonseed Products.-- (Phase 1 - Factors Affecting Cotton Prices in Local Markets. Phase 2 - Cost of Handling Cottonseed at Gins.) -- Phase 1 - To determine effectiveness of various local markets in reflecting to farmers average price level prevailing for cotton, and central market premiums and discounts in accordance with variations in quality. Phase 2 - To determine and evaluate most economical methods and equipment available for handling cottonseed at gins to suggest improvements in practices, services, and reduced cottonseed handling costs.

Agr. Econ. 566 (SH-1), coop. USDA

- Ia. A Study of the Destructive and Beneficial Insects of Sugarcane in Order to Develop Economical and Practical Measures of Controlling the Harmful Species. To determine or further refine and correlate control measures of the important insects attacking sugarcane thru studies of biology of the pests and their natural enemies and insecticidal, cultural, and biological control practices for such insects as sugarcane borer, rootstock weevil, aphids, wireworms, nematodes, springtails, sugarcane beetle, parasites and predators.

Ent. 581, coop. USDA

- Ia. To Conduct Studies on the Ecological Factors Responsible for Destructive Outbreaks of Cotton Insects. To obtain information on ecological factors responsible for destructive outbreaks of cotton insects and to develop methods for accurately forecasting such outbreaks.

Ent. 606

- Ia. Soil Structure Studies on the Rice, Sugar Cane, and Cotton Soils of Louisiana. To study (1) the relationships between soil structure and the growth of rice, sugar cane and cotton, and (2) methods of improving soil structure and soil aeration.

Crops, Soils 610

- Ia. To Develop Methods for Improving the Crop Environment for the Growth and Maturity of Sugar Cane Through the Aid of Agricultural Chemicals. To develop methods of improving the environment for the growth of sugar cane crops, with efforts made to secure early stands and suckering, rapid and early growth and a continuous and vigorous growth throughout the growing season in order to secure maximum field yields and early maturity.

Sugar Cane 681

- Ia. Studies on Sugarcane Diseases. To (1) study cause and control of diseases of sugarcane with special emphasis on Phytophthora rot, mosaic, red rot and root rot; (2) develop information on resistance of cane varieties to major diseases of sugarcane; and (3) investigate nature of seed cane failures and stubble failures and develop methods of control.

Pl. Path. 766

- Ia. The Ratoon Stunting Disease of Sugarcane. To determine (1) presence of ratoon stunting virus or a similar one in Louisiana; (2) role of virus in degeneration of varieties which apparently are senescent; (3) if hot water treatment will permit development of virus free seed stocks; (4) all modes of spread of the disease to aid control; (5) a means other than inoculation to identify virus in stalks either not obviously stunted or in area where environment is not productive of good growth; (6) inheritance of resistance to obtain production of new resistant varieties; and (7) environmental factors responsible for severity of the disease.

Pl. Path. 773

- Ia. Enterprise Combinations, Management Practices, Costs and Income on Farms in the Sugar Cane Section of Louisiana. To obtain annual data from farmers on family type farms in the sugar cane section of southern Louisiana concerning the business organization, management practices, input and output relationships by enterprises and for the farm as a unit.

Agr. Econ. 824

- Ia. Soil Physical Conditions and Fertilizer Placement as Related to the Production of Cotton, Corn and Sugar Cane. To (1) determine extent and location of soil areas of compacted and impervious layers that restrict root penetration, (2) measure physical properties of the layers or horizons of the soil at a given location in terms of bulk density, pore size distribution, porosity, structural stability and permeability, (3) employ deep plowing, subsoiling, deep application of fertilizers to increase yields of crops on soils with undesirably physical characteristics, and (4) evaluate effects of subsoiling, deep plowing and fertilizer placement on the physical characteristics of the soil.

Crops, Soils, Engin. 850

- Ia. Transfer of Genes for High Quality of Fiber From *Gossypium Barbadense* to American Upland Strains of Cotton. To (1) attempt to combine the superior length, strength, and fineness of fiber in strains of species *Gossypium barbadense* with the high yield, high lint percentage and early maturity of varieties of Upland cotton now grown, and (2) test effectiveness of new methods of plant breeding in combining genes for desirable quantitative characters by interspecific hybridization.

Agron. 852, coop. USDA

- Ia. Development of Techniques and Evaluation of Chemicals for the Defoliation and/or Second-Growth Inhibition of Cotton. (1) Screen and evaluate new chemicals as defoliants and second-growth inhibitors. (2) Study process of abscission and second-growth inhibition. (3) Develop ground spray machines for field application of defoliants and/or second-growth inhibitors. (4) Evaluate different nozzles and nozzle arrangements. (5) Determine proper spray volume and rate of chemical. (6) Evaluate concept of bottom defoliation as an aid to reducing boll rot.

Pl. Path., Agr. Engin. 885

- Ia. To Study Those Factors Which Affect Cotton Fiber Quality. To learn (1) fiber length, length uniformity, fineness and strength of fibers of varieties and advanced strains; (2) effects of different methods of harvesting cotton on fiber length, length uniformity, fineness and strength of fibers; (3) effect of certain insects, spider mite, and nematode infestations, upon fibers.

Agron., Entom., Home Econ. 895

- Md. Production, Harvesting, Curing and Storing of Maryland Tobacco.--D. Tobacco Housing. To determine optimum conditions of temperature, humidity and air movement for the curing and storing of tobacco, to determine the extent to which it is economically justifiable to achieve these conditions, and to design and develop equipment and methods to maintain these conditions as uniformly as possible in all parts of full-size barns.

Agr. Engin. R-11-D

- Md. Production, Harvesting, Curing and Storing of Maryland Tobacco.--E. Structures and Equipment for Tobacco Stripping. To determine the best design of stripping room as affected by size, arrangement and natural and artificial lighting; to determine optimum conditions for keeping tobacco in desirable condition and to design and test equipment for this purpose; and to develop new and improved equipment for stripping operations.

Agr. Engin., Agron. R-11-E

- Id. Development of Improved Strains of Maryland Tobacco Resistant to Diseases. To develop improved strains of Maryland tobacco resistant to major diseases of tobacco, as mosaic, black root rot, wildfire, black shank, Granville wilt, and fusarium wilt.
Bot., Agron. J-95, coop. USDA
- Mass. The Improvement of Havana Seed Tobacco. To improve Havana Seed tobacco inherently by breeding new strains of tobacco which combine high resistance to black root rot, common tobacco mosaic, and wildfire, with habits of growth and yielding capacity that are highly acceptable to growers, and, also, the capacity to produce tobacco of type of quality that are highly acceptable to cigar manufacturers.
Agron. 4
- Mass. Studies of the Usefulness of Soil Conditioning Materials in the Production of Tobacco Plantbeds. To ascertain effects that the use of soil conditioning materials in the production of tobacco plantbeds, may have on the growth of tobacco seedlings.
Agron. 8
- Minn. Soybean Genetics. To (1) study inheritance and heritability of important characters in soybeans, (2) learn mode of action and study segregation in succeeding generations of genes determining quantitative characters in soybeans, (3) evaluate responses of known genotypes under various environmental conditions with particular respect to effects on maturity, oil content, and yield, (4) study and develop techniques of investigation of quantitative inheritance.
Agron., Pl. Genet. 1322, coop. USDA
- Minn. Biology and Importance of the Sugar Beet Root Maggot (*Tetanops myoraeformis* Roder) in Minnesota. To (1) investigate importance and distribution of the sugar beet root maggot, (2) make observations on biology of this insect under field conditions in northwestern Minnesota, (3) initiate experiments on methods of control of the insect is found to be sufficiently important to justify such work.
Entom., Zool. 1733

- Miss. Epidemiology of Leaf Spots and Other Foliage Diseases of Crop Plants.--III. Soybean and Legume Crops. To study prevalence and distribution of diseases of soybeans and other legume crops.
Pl. Path. & Bot. 2219-3
- Miss. Cotton Improvement Through a Genetic Study of the Introduction of Genes from the Diploid American and Other Diploid Species of Gossypium. To study inheritance of certain characters, such as gossypol, oil, bract size and lintlessness, in cotton using crosses involving hirsutum as one parent and segregates from a species hybrid, hirsutum x (armourianum x thurberii), as the other.
Agron. AC-3
- Miss. The Residual Effect of Various Herbicides on Cotton and Other Crops. To (1) determine rate of disappearance of certain herbicides from soil under field conditions, and (2) evaluate effects of these herbicides on crop and weed plots under varying soil conditions.
Pl. Path. FL-9
- Miss. The Influence of Cropping Systems on Soil Properties and Crop Production. Learn (1) effect of different crops in rotation with cotton and soil properties, and on crop yields, (2) length of time various crops should be grown on a soil for optimum benefits, (3) residual effects of sod crops on soil properties and on cotton yields.
Soils, For., Agron. FU-2
- Miss. Sorgo Improvement. To evaluate new sorgo strains for sirup and silage and to assist in any spacing, irrigation, or fertility trials which interested workers may agree should be made.
Agron. HC-1
- Miss. Investigation of the Seedling Diseases of Cotton and Their Control Under Mississippi Conditions. To (1) evaluate value of various chemical seed treatment materials for prevention of diseases of cotton seedlings, and determine other characteristics of these chemicals which would be of benefit to seedsman and farmer; (2) study post-emergence diseases of cotton and attempt to develop effective control measures; and (3) study seed borne diseases of cotton and attempt to determine feasibility of disinfecting cotton seeds of seed-borne pathogens.
Pl. Path., Phys. HL-1

Miss. Economic Importance and Ecology of the Bollworms and Spider Mites Affecting Cotton in Mississippi. To determine: (1) relative importance of bollworm damage to squares and bolls in relation to fruiting cycle; (2) relative abundance of each species (H. armigera and H. virescens) on cotton relative to fruiting cycle of plant and season; (3) seasonal host relationships, both wild and cultivated, for each species; (4) seasonal cycle of each species, parasites, and predators, effect of weather on eggs, larvae and pupae, and other ecological factors which observations indicate have a bearing on their importance as pests of cotton; (5) importance of spider mite infestations relative to fruiting cycle of the plant; (6) species of spider mites occurring on cotton, their importance and wild hosts; (7) factors affecting abundance and distribution of spider mites in cotton fields; (8) most effective insecticides and acaricides; and (9) most efficient means of applying insecticides and acaricides.

Entom. PH-2

Miss. Investigation of the Diseases of Cotton and Their Control Under Mississippi Conditions. To (1) develop greenhouse and field techniques to determine resistance and susceptibility to certain cotton diseases; (2) investigate seed stocks and sources now available, and those becoming available, for resistance to major cotton diseases, and incorporate any resistance found into types suited to this region and culture; (3) study genetics of resistance; and (4) design and conduct work on other forms of disease control where such control is necessary and appears feasible.

Pl. Path. & Phys. Pl-1

Miss. Factors Affecting Cotton Prices in Local Markets. To determine effectiveness of various local markets in reflecting to farmers the average price level prevailing for cotton, and in reflecting the central market premiums and discounts in accordance with variations in quality.

RRFA-1, Agr. Econ. FA-1 (SM-1), coop. USDA

Miss. Effects of Price Support, Acreage Adjustment and Surplus Removal Programs Upon Southern Agriculture.
To (1) measure and appraise effects of Federal Price Support, acreage adjustment and surplus removal programs upon supply, consumption, markets and prices, and gross income from cotton; (2) measure and appraise effects of cotton programs in terms of concurrent changes in farm enterprise combinations, market systems and interrelationships of product and factor prices of cotton; and (3) study interconnections of programs for cotton with programs for other commodities important in Mississippi agriculture, and examine interaction of effects of such programs.

Agr. Econ. RRFA-7 (SM-14)

Miss. A Comprehensive Collection of Stocks of Mendelian Characters, Principal Commercial Varieties and Selected Inbred Lines of Upland Cotton. To (1) maintain a genetics garden and a catalogued seed supply of characters segregating in Mendelian ratios; (2) maintain a catalogued supply of viable seed of all commercial varieties and certain selected inbred lines of cotton; and (3) screen material of upland or Sea Island Stocks collected in other countries, evaluate it, and add to the Regional Collection those having desirable or outstanding characteristics.

Agron. RRFU-1-a (S-1)

Miss. Fundamental Studies of Properties of Cotton Species, and the Development and Use of Techniques to Facilitate the Transference of Desirable Characters to Upland Cotton. To (1) maintain and propagate cotton species, interspecific hybrids, and other stocks necessary for prosecution of fundamental cytogenetic experiments in progress, or to be started, and to procure other stocks or materials as may be required; (2) survey basic stocks, certain hybrid progeny and various derived lines for desirable plant characters and fiber properties; (3) study critically the cytogenetic problems in transferring these characters and properties to a stable Upland cotton background; and (4) develop and extend experimental techniques to be used in character transference study.

Agron. RRFU-1-b (S-1)

Miss. Inheritance Studies Concerning Yield, Fiber Properties, and Disease and Insect Resistance in Upland Cotton. To (1) classify and isolate as far as possible factors which affect yield, fiber properties, and disease and insect resistance, (2) determine when possible genetic ratios expressed by simply inherited factors and number of factors involved where inheritance is more complex; and (3) determine at what stage in cotton development, specific factors are operating to produce end results observed.

Agron. RRFU-1-c (S-1)

Miss. Improvement of Methods and Equipment for Growing Cotton. To (1) determine efficiency of different types of stalk shredders and improve machines for stalk disposal, (2) evaluate methods of seedbed preparation and learn effect of different methods of preparation on stand, weed control and crop yield, (3) learn effects of several deep tillage methods on hardpa soils of the Yazoo-Mississippi Delta, (4) learn effect of different openers and planting methods on stand and yield with special reference to improved seed germination and stands in heavy clay soils of the Yazoo-Mississippi Delta, (5) test, evaluate, and improve new or experimental equipment for field application of both liquid and granular fertilizers, (6) design, test, evaluate, and improve machines and techniques for the application of both pre- and post-emergence herbicides, (7) test, modify and improve mechanical methods of weed control, including flame cultivation equipment, and (8) evaluate and improve machines and methods for controlling cotton insects with particular emphasis on efficiency of application and adaptability of equipment for multiple uses.

Engin., Agron. RRFU-2-a (S-2), coop. USDA

Miss. Improvement of Methods and Equipment for Defoliating and Harvesting Cotton. To (1) determine most effective stands and plant spacing for mechanical cotton harvesting in the Delta area, (2) evaluate cultivation and weed control practices and develop methods for efficient mechanical harvesting, (3) test and improve methods and equipment for the application of defoliants and to determine the effect of defoliation on mechanical picking efficiency and quality of machine picked cotton, (4) study the mechanical characteristics of basic types of mechanical pickers and to determine their effectiveness under similar conditions, (5) determine amount of water actually added to seed cotton during the picking operation and its ultimate effect on seed cotton storage and quality of lint, (6) investigate and locate causes of large concentrations of leaf trash and other foreign matter in mechanical cotton picker storage baskets, and (7) evaluate performance of mechanical pickers in commercial and advanced experimental varieties of cotton grown in the Mississippi Delta area.

Engin., Agron. RRFU 2-b (S-2), coop. USDA

Miss. Correlation of Regional Projects on Cotton Mechanization. To correlate projects, analyze and disseminate information on the various project being conducted on the Cotton Mechanization Regional Study.
Agr. Engin. RRFU-2D (S 2)

Mo. Improvement of Missouri Soybean Crop. To (1) breed and introduce superior varieties and find their adaptation to local areas; (2) study mode of inheritance of genetic factors related to crop yield and seed quality, with attention to inheritance of disease resistance and breeding disease-resistant varieties; (3) study effect of cultural techniques, environmental factors, and soil treatments, upon yield and quality of soybean seed; and (4) study to compare and improve efficiency of known methods of breeding and discover new methods, and measure correlation of physical properties and features of soybean plant with yield and oil content of the seed.
Field Crops 49, coop. USDA

- No. A Study of Cotton Marketing in Missouri, Including Pricing Mechanisms in Local Markets, and the Effect of Quality and Market News Services on Price. To discover factors affecting the level of price and the price differentials due to quality differences in local markets, the effect of quality and price information on price establishment.
Agr. Econ. 65 (SM-1)
- No. Research in Efficiencies of Cotton Production. ---
a. Testing of Cotton Varieties. To test: (1) new varieties bred by other experiment stations or by commercial breeders and (2) a highly select list of varieties already established, in order to find for local cotton growers the best varieties currently known.
Field Crops 160-a
- No. Research in Efficiencies of Cotton Production. ---
b. Breeding New Varieties of Cotton. To develop new varieties specially adapted to natural conditions and economic preference in Southeast Missouri.
Field Crops 160-b
- No. Research in Efficiencies of Cotton Production. ---
c. Testing Fertilizers on Cotton. To find the effects of fertilizers on yield, and earliness of maturity.
Field Crops 160-c
- No. Research in Efficiencies of Cotton Production. ---
d. Control of Weeds in Cotton. To fully establish the effective control of weeds as a factor in lessening the cost of cotton production.
Field Crops, Agr. Engin. 160-d
- No. Research in Efficiencies of Cotton Production. ---
e. Cotton Defoliation. To find effects of defoliation on earliness and the related yield.
Field Crops 160-e
- No. Insects of Cotton in the Cotton Growing Section of Missouri. To become familiar with the biology and habits of major insect pests of cotton in the cotton section of Missouri; to evaluate their importance; determine the insect pest population levels which justify use of control measures; and work out effective controls.
Entom. 214

- No. Soil Fertility and Cotton Production. To study
(1) cotton fertilization; (2) boll set and drop of cotton
squares as influenced by soil treatments; and (3) cropping
sequence in cotton production.
 Soils, Agron. 267
- No. Water Management in Cotton Production. To study
(1) problems relating to obtaining suitable water supply
for irrigation, (2) methods and improve techniques for
applying irrigation water to cotton, (3) methods and
improve techniques of drainage.
 Agr. Engin., Field Crops 271
- Mont. Development by Testing and Selection of Varieties
of Sugar Beets Resistant to Aphanomyces, Rhizoctonia, and
Fusarium Root Rots. To (1) test resistance of new
varieties of sugar beets to Aphanomyces, Rhizoctonia, and
Fusarium root rots; and (2) determine if resistance is
correlated to certain environmental factors such as
temperature, percentage of moisture in soil, soil type,
and soil nutrients, and determine reaction of various
strains of these organisms on beet varieties.
 Bot. & Bact. 916
- Mont. Improvement of Soil Fertility for Sugar Beet
Production Through Organic Matter and Fertilizer Treatments.
To determine (1) value of organic matter in improving
soil fertility for sugar beets thru comparisons with
commercial nitrogen fertilizer; (2) comparative value of
green manure, barnyard manure, and N fertilizer in
improving soil fertility for sugar beet production; and
(3) relative value of sweet clover and alfalfa as green
manure crops under different systems of irrigation.
 Agron. 944
- Nebr. Selection, Breeding, and Testing of Soybeans for
Productivity, High Oil and Protein Content for Industrial
and Farm Utilization. To (1) conduct uniform tests of
U. S. Regional Soybean Lab. designed especially to improve
and test varieties for industrial uses and (2) determine
effects of differences of soil and other environmental
influences, including diseases, on yield and composition
of soybeans--including improvement and testing of
varieties for home use as feed and food.
 Agron. 270, coop. USDA

Nebr. The Etiology and Control of Soil-Borne Diseases of Sugar Beets. To determine (1) identity of the organisms causing pre- and post-emergence damping-off of seedlings, root rots, wilt, and storage rots following these diseases, and effect of cropping systems, cultural practices including seed treatments, soil types, and environmental factors on occurrence of these diseases; and (2) factors for resistance, and discovery of resistant parent stocks.

Pl. Path. 314, coop. USDA

Nebr. Development of Crops for Industrial or Other Special Uses. To study adaptation and determine economic value of varieties of new or potential crops for special uses in state; improve adaptation of potential or present crops for special uses by breeding and selection; conduct cultural and weed control studies with new crops; conduct fundamental research to augment improvement program.

Agron., Pl. Path. 506, coop. USDA

Nev. Cotton Weed Control in Southern Nevada. Test weed control measures developed in other areas for Nevada conditions, find economical control for Johnson grass and perennial morning glory.

Agron. 15

N. Mex. Testing Sugar Beet Strains and Varieties for Curly-Top and Leaf Spot Resistance. To (1) test strains and varieties of Sugar Beets for yield, percentage sugar, size and shape of beets, and resistance to curly-top and leaf spot; (2) increase in isolated plantings, seed of select mother roots which have characters sought in objective 1; and (3) increase select seed lots in isolated plantings to make seed available for commercial plantings.

Agron. 9, coop. USDA

N. Mex. Breeding Upland Cotton and the Evaluation of Strains and Varieties for Southern New Mexico. To (1) develop strains or varieties of upland cotton that have the following characteristics: High yield, early maturity, strong seedling vigor, high tensile strength, high degree of fiber maturity, desirable degree of fineness, staple length of 1-1/16 to 1-1/8 inches, superior spinning quality, resistant or tolerant to Verticillium wilt, resistant to bacterial blight, (2) determine adaptation of strains and varieties produced in this and other breeding programs to the different producing areas of New Mexico, (3) estimate grade and staple of cotton produced in New Mexico.

Agron. 12, coop. USDA

N. Mex. Cotton Variety Tests. To determine (1) relative merits of various upland cotton strains developed for irrigated Southwest and of commercial cotton varieties from the eastern cotton belt on: yield and quality of fibers, adaptation, early maturity, lint percentage, etc., and (2) comparative yield, quality of fibers, adaptation, disease resistance of varieties and strains of American-Egyptian cotton.

Agron. 19, coop. USDA

N. Mex. Water Requirements of Cotton (Extra-Long Staple, and Upland, Acala 1517C) Grown on Light-Textured to Medium-Textured Soils in Mesilla Valley, New Mexico. To determine (1) desirable frequencies of irrigations for cotton production; (2) desirable range of depths of irrigation applications for optimum production with limited, and an adequate water supply; (3) effect of variable depth irrigation applications; (4) utility of electrical resistance blocks as a suitable method for determining "When to irrigate", and (5) relative use of water by single beds as compared to double beds with furrow irrigation.

Agr. Engin. 41

N. Mex. Development of Improved Methods and Equipment for Planting, and Late Weed Control in Cotton Production. To develop or modify (1) a planter opener and covering device to plant at uniform depth, prevent dry soil from being deposited around seed, prevent void space from remaining in soil around seed, reduce lateral placement of seed to minimum, and partially prepare seedbed during planting operation; and (2) equipment and methods for complete weed control.

Agr. Engin. 42 (7-24)

N. Mex. The Genetics of Bacterial Blight Resistance and the Value of Osmotic Selection in Upland Cotton. To (1) determine genetic basis of resistance to blight, including problems of allelism, gene interaction, pleiotropy, and linkage; (2) use induced mutation to obtain blight resistance in agronomically desirable but susceptible material, as well as to obtain new types of resistance; (3) determine if and in what way osmotic selection can be of benefit in applied cotton breeding work, and (4) perfect techniques for using osmotic selection to best advantage with cotton.

Agron. 45 (S-1)

- N. Mex. The Occurrence of Beneficial Insects as Related to Insecticidal Control Programs for Hemipterous Insect Pests of Cotton. To determine (1) occurrence and abundance of beneficial insects in cotton fields; (2) relative importance of species found, in terms of predatory or parasitic preference for hemipterous insects injurious to cotton, and (3) effect of chlorinated hydrocarbon type insecticides on beneficial insects when applied as control of harmful hemipterous species.
Biol. 54
- N. Y. Studies of Hereditv in Plants.--C. Cytogenetic Studies of Nicotiana and Related Problems. To determine the mode of inheritance of numerous characters of the plants studied.
Pl. Brdg. 2 C
- N. C. The Comparative Cytogenetics of Upland Cottons and Related Diploid Species. To (1) maintain collection of wild species of Gossypium in a vigorous condition; (2) assess their value with regard to characters of potential economic value which they may possess; (3) hybridize them with cultivated cottons, giving emphasis to obtaining hybrids with American wild species; (4) synthesize fertile types by colchicine treatment of initial hybrids and backcross them to Upland cottons; (5) investigate cytological mechanism in such backcrosses making use of cytological and cytogenetic methods; and (6) develop efficient techniques of transferring characters of potential economic importance based on a more complete understanding of cytological mechanism.
Agron. 9 (S-1), coop. USDA
- N. C. Peanut Breeding and Cultural Investigations. To develop strains of peanuts with greater yielding ability, high oil content, and superior disease resistance; and to determine the relative response of different types or varieties, as measured by both yield and quality, on different soil types and to various cultural practices.
Agron. 10, coop. AEC

- N. C. The Federal Peanut Programs and Their Effects on Peanut Farming and Marketing. To (1) measure and appraise effects of federal price support, production adjustments and surplus removal programs on supply, consumption, markets and prices of peanuts, with emphasis on competition between type of peanuts grown in North Carolina and Virginia, and types grown in other sections of the South; (2) measure and appraise effects of programs on income from peanut farming, allocation of resources within, and between, farms, and interrelationships of product and factor prices in peanut growing regions; (3) study interconnections of peanut programs with programs for cotton and tobacco, and examine interaction of effects of such programs at farm level; and (4) make available to farmers and general public, pertinent information on peanut program.

Agr. Econ. 14 (SM-14)

- N. C. Riboflavin Content of Soybeans and Cowpeas.--
A. Growth Stimulant(s) Associated with Riboflavin in Soybeans. To (1) find why rat-growth bioassay for riboflavin in soybeans yields values approximately twice those obtained by the photofluorometric method, and (2) isolate and determine the nature of interfering substances.

Anim. Indus. 16

- N. C. The Internal Mechanism of Species Generation in Cotton. To analyze and evaluate internal factors which account for differentiation and genetic isolation of interfertile species, including (1) recombination and transmission of genes in interspecific hybrid progenies; (2) effects of introgression on gene action, expression and coordination; and (3) comparative studies of homologous genetic loci in related species at biochemical level.

Genet., Bot., Agron. 21

- N. C. Fundamentals of Tobacco Curing. To formulate basic curing principles pertinent to development of improved methods and procedures for processing and marketing tobacco.

Agr. Engin., Agron. 23, coop. USDA

- N. C. Soil Fertility in Relation to Soybean Growth and Production. To (1) determine relative importance and contributions of native soil fertility, other properties of entire root zone, and supplementary plant nutrients to growth and fruiting of soybeans; and (2) study relationships between soil and environmental conditions and crop in soybean growing areas of North Carolina with special reference to factors which are limiting yields.

Agron. 30

- N. C. Residues of Endrin and TDE on Tobacco. To (1) evaluate, modify, and adapt chemical methods of analysis of endrin and TDE for use in determining residues on fresh, cured, and processed tobacco; (2) develop sampling techniques on fresh, cured, and processed tobacco for evaluating magnitude of residues of endrin and TDE; and (3) determine effect of foliar applications on aroma and flavor of processed tobacco in relation to effective use of these chemicals in controlling insect pests.

Chem., Entom., Agron. 34 (S-22)

- N. C. Investigation of Insects Affecting Forage Crops in North Carolina. To study insects associated with peanuts, pasture and hay, soybeans, small grains and sorghum and to determine how to contend with those adversely affecting production of these crops.

Entom., Hort., Chem., Agron., Pl. Path. 38

- N. C. The Development of Principles and Practices for the Control of Weeds in Cotton, Peanuts, Soybeans, Forage Crops, Turf and for the Control of Nutsedge, Johnson Grass and Woody Plants. To develop (1) for North Carolina reliable, practical and economical practices for solution of above weed problems; and (2) principles of weed control particularly as related to weed control practices in North Carolina.

Agron., Agr. Engin. 41

- N. C. Cotton Improvement and Breeding Methodology. To (1) introduce and transfer desirable germ plasm from various wild and cultivated Gossypium species into adapted Upland cottons, with emphasis on improved fiber properties; (2) develop and evaluate more efficient cotton breeding techniques; and (3) evaluate current varieties and new strains for North Carolina.

Agron. 46, coop. USDA

- N. C. Tobacco Mechanization. To determine principles pertaining to the mechanization of tobacco culture, evaluate their importance and apply them toward improving present cultural practices.
Agr. Engin., Agron. 48, coop. USDA
- N. C. Studies of Certain Physical and/or Chemical Properties of Tobacco as Related to Quality. To (1) devise new methods or adapt existing procedures for measurement of physical or chemical characteristics of tobacco as related to quality, (2) study relationship between these measurable properties and quality, and (3) integrate into quality evaluation schedule, measurement of appropriate characteristics.
Agron. 51
- N. C. Opportunities for Increasing Efficiency in the Production of Flue-Cured Tobacco. To (1) learn costs of and returns from new forms of technology and production practices as applied to individual farm units; (2) learn cost of mechanization to tobacco production and effects of labor requirement and yield and quality of tobacco; (3) appraise effect of technological developments on total production and on prices and income; (4) learn competitive position of tobacco relative to alternative enterprises in farming systems; (5) learn most efficient organizations of enterprises for farming systems in tobacco areas; (6) develop reorganized farming systems using changes in technology and institutional arrangements.
Agr. Econ., Agron. 57
- N. C. The Control of Cotton Insects in North Carolina. To (1) determine thru field experiments, best available chemical and cultural control for important cotton insects, including boll weevil, boll worms, thrips, mites and aphids; (2) conduct lab screening tests on these pests using new candidate insecticides to find new and better materials for control; (3) study possible correlation between climactic conditions and cotton pest incidence; and (4) determine effects of insecticide residues occurring in the soil as a result of chemical control of cotton insects on crops subsequently grown on same land.
Entom. P57

- N. C. Peanut Curing Studies. To (1) correlate response of peanuts to their environment during curing process; (2) use formulations from above objective as functional design specifications in development of a practical curing system.

Agr. Engin., Agr. Chem., Stat., Agron. 65

- N. C. The Influence of Plant Nutrients Upon the Development of the Peanut Plant and Upon the Quality and Quantity of Fruit Produced. To (1) characterize deficiency conditions in peanuts for all mineral elements considered to be essential for plant growth; (2) evaluate effect of different plant nutrients upon production of flowers and development of fruit; (3) characterize changes in chemical composition of different parts of plants throughout growing period; and (4) study physiological interrelationship between boron and calcium in peanuts.

Agron., Bot., Stat. 70

- N. C. An Analysis of Preference Exhibited by Boll-Weevils for Certain Varietal Characteristics of Cotton, and an Evaluation of the Possibility of Breeding for Resistance to Boll-Weevil (Anthonomus Grandis Boh.). (1) Assemble a collection of simply inherited, morphological and physiological variants in cotton deterrent to boll-weevil. (2) Test if weevils exhibit preferences when offered choice of hosts in replicated tests. (3) Combine into one strain all variant physiological and morphological characteristics weevil has exhibited a negative preference for. (4) Learn if true resistance can be built up from combination of negative preferences. (5) Study nature of any preferences established. (6) Study magnitude and nature of any harmful effects on fiber or yield associated with variants of investigation. (7) Evaluate possibility of introducing an economic degree of weevil resistance into cotton by genetic means.

Genet., Field Crops 71

- N. C. The Productivity of Peanut Soils as Influenced by Crop Sequence and Management Practices. To (1) isolate factors responsible for marked reduction in productivity of soils which are planted frequently to peanuts; and (2) evaluate different crop rotations and use of various fertilization and management practices upon production of peanuts and other crops in the rotation.

Agron., Pl. Path., Entom. 72

- N. C. The Investigation of Genetic Variability of Soybeans and the Effect of Various Characters on Yield and Chemical Composition. To (1) estimate for the various characters of soybeans, (a) magnitude of genetic variability and changes in variability resulting from selection, (b) nature and magnitude of interactions between genotypes and environment, (c) expected genetic advance due to different degrees of selection, and (d) genetic correlations; (2) develop breeding procedures to make maximum use of genetic variability; and (3) obtain information on relative importance of various characters on yield.

Agron., Stat. 76, coop. USDA

- N. C. The Breeding of Grain-Type Soybean Strains that are Superior to Existing Varieties in Agronomic Characters and Possess Resistance to the Common Diseases. To (1) develop soybean strains that are resistant to shattering and lodging and that produce high yield of good quality seed that are high in oil and protein; and (2) study inheritance of resistance to certain diseases and to transfer resistance to these diseases and resistance to bacterial pustule to strains possessing good agronomic characters.

Agron., Pl. Path. 77

- N. C. Etiology, Epiphytology and Control of Soil-Borne Diseases of Peanut. To (1) obtain basic information on influence of environmental factors, cropping and cultural practices, soil microflora, and varietal susceptibility upon severity of soil-borne diseases of peanut caused by various bacteria, fungi, and nematodes; and (2) use such basic information in developing effective, practical control measures.

Pl. Path., Agron., Entom. 87

N. C.

The Effect of Herbicides Upon the Germination and Growth of Certain Crops as Influenced by Environment Species and the Physiological Condition of the Plant. To study (1) effect of certain pre-emergence herbicides upon germination of cotton, peanuts, soybeans, and forage crops as influenced by relationships between rainfall, soil physical properties, temperature, and rate and time of application of herbicides; (2) effect of certain post-emergence herbicides upon some of more important forage legumes as influenced by relationships between species, age, stage of growth, and physiological conditions of plants.

Agron. 173 (S:18)

N. Dak.

The Structure of Certain Carbohydrates in Flaxseed Hull. To determine more completely the structure of a complex carbohydrate found in the flaxseed hull.

Agr. Chem. 1-2

N. Dak.

Chemical Modification of Flaxseed Mucilage. (1) Prepare chemical modifications of flaxseed mucilage. (2) Study physical and chemical properties of chemical modifications. (3) Learn if modified mucilages will be commercially useful for gelling agents, emulsifiers, adhesives, or wetting agents.

Agr. Chem. 2-4

N. Dak.

Biology and Control of Sugar Beet Root Maggot, Tetanops Myopaeformis. (Von Roder). To (1) obtain knowledge of biology of this root maggot under sugar beet growing conditions, (2) establish distribution of the pest in North Dakota and if possible learn the factors which delineate its areas of economic importance, and (3) develop practical control measures applicable to North Dakota conditions.

Entom. 5-2

N. Dak. Breeding and Genetics of Flax. To (1) develop varieties of flax with desirable agronomic qualities--high resistance to wilt Fusarium lini; resistance to races of rust; tolerance to pasmo, Sphaerella linorum; and quantity and quality of oil, and seed yielding ability; and (2) determine if some relationships exist between reaction to rust and other characters of flax.

Agron. 6-13, coop. USDA

N. Dak. Preservation of Certain Physiologic Races of Flax Rust Melampora Lini. To (1) preserve and maintain in uredinial stage races of flax rust having desired genes for virulence on selected flax varieties; and (2) test material for flax breeders who desire such assistance, or furnish them on request specific cultures for such testing.

Pl. Path. 13-1 (NC-7), coop. USDA

Ohio Development and Evaluation of Improved Varieties of Soybeans for Farm and Industrial Utilization. To (1) develop by introduction, hybridization and selection improved strains of soybeans adapted to Ohio; (2) cooperate thru U. S. Regional Soybean Lab in interstate programs of exchange and evaluation of basic breeding, stocks, segregating populations, and promising new strains originating from breeding programs of all cooperating states; (3) make genetic studies as they may affect methods of breeding and field plot technique; (4) assist in orderly, effective program of increase and early distribution of foundation seed of new improved strains; and (5) evaluate breeding material to existing varieties in regard to reaction to soybean diseases prevalent in Ohio.

Agron. 46, coop. USDA

Okla. New Developments in the Use of Fungicides for Cotton Seedling Disease Control. To protect cotton seed against decay and cotton seedlings against damage from seedling disease pathogens.

Bot., Pl. Path. 482

Okla.

Mechanized Cotton Harvesting in Oklahoma.

Subproject IIA (1) To evaluate several methods of preparing the cotton for harvest and several dates of preparation as such preparation affects the performance of the cotton harvester and the resulting quality and new yield of cotton; Subproject IIA (2) To (1) evaluate and improve stripper roll materials, to evaluate the influence of stripper roll speed on harvester performance, and to evaluate and improve the stripper roll shielding and entrance section shielding on present commercial cotton harvesters; (2) evaluate the various methods of conveying cotton from the stripping chamber to the wagon with particular emphasis on amount of cleaning obtained by each method of conveying, and also to learn the elements of cotton conveying which affect the quality of cotton lint; and (3) evaluate and improve other functional mechanisms of the cotton stripper not referred to in the above objectives, to evaluate other machines involving new principles, and to evaluate cotton pickers for their possible application to Oklahoma conditions; Subproject IIB To (1) evaluate harvester performance on most common varieties of cotton grown in Oklahoma; and (2) evaluate and improve harvester performance as related to different plant populations and characteristics typical of different populations.

Agr. Engin., Agron. 578 (S-2), coop. USDA

Okla.

Cotton Marketing. To determine (1) extent to which quality differentials in central markets are reflected in prices paid farmers in local markets; (2) extent to which premiums and discounts vary with type of market information available; (3) relationship of size of sales and average quality of cotton to price paid to growers; (4) relation of average quality of cotton sold in local market to average price received by growers selling in the market; (5) premiums and discounts for grade and staple lengths reflected in prices paid to growers for different kinds of cotton; and (6) improvements that might be made in market news and price information in local markets.

Agr. Econ. 605 (SM-1)

Okla. Marketing Mechanically Harvested Cotton. To (1) analyze current practices and determine marketing problems that have developed, or are likely to develop with machine harvesting of cotton, and determine the solutions, and (2) report most efficient solutions shown by data and suggest improvement in marketing machine harvested cotton.

Agr. Econ. 611 (S-1)

Okla. Adapting and Testing Cotton Ginning Equipment and Techniques. Sub-Project IV-A.--To (1) test, evaluate, and improve new or experimental equipment for adaption of Oklahoma type cotton production; and (2) devise, test, evaluate and design methods and techniques for preparing; conditioning, and ginning cotton harvested mechanically under new or experimental field conditions; Sub-Project IV-B--For cotton grown in (a) humid upland, (b) humid bottomland, (c) dry upland, and (d) irrigated upland - To (1) determine the combination of drying, cleaning, and extracting machinery in overhead systems; (2) determine the correlation between drying and lint cleaning; (3) determine amounts of overhead and lint cleaning equipment to be used in rough harvested cotton; and (4) study effects of cleaning on color of lint sample.

Agr. Engin. 753 (S-2)

Okla. Development of Improved Machines and Methods for Seedbed Preparation Planting and Early Weed Control in Cotton Production. Subproject I-B--To evaluate some newer tillage tools for their place in seedbed preparation for cotton production; Subproject I-C--To (1) evaluate existing seed grading equipment and determine physical measurements of cotton seeds; (2) evaluate performance of different grades of cotton seed as to emergence and yield; (3) evaluate performance of graded seed in now available planters and modify planters to exploit unique physical dimensions of seed; (4) evaluate planter performance in obtaining different plant populations; (5) study beneficial effects of planting seed at different depths; (6) evaluate and improve present furrow openings on cotton planters; (7) evaluate and improve seed bed profiles as they may promote more rapid and better emergence; and (8) evaluate available covering devices now used; Subproject I-D--To (1) determine influence of machines and chemicals now available for early weed control; (2) find influence of plant population on number of weeds and ease of controlling weeds; and (3) improve seedbed profiles to minimize early season weed control problem.

Agr. Engin. 802 (S-2)

Okla.

Effects of Cotton Price Support, Acreage Adjustment, and Surplus Removal Programs upon Oklahoma Agriculture. To analyze and appraise the effects of (1) Federal price support, acreage adjustment, and surplus removal programs upon the supply, domestic and foreign consumption, markets and prices, and gross income from cotton lint; and (2) cotton programs in terms of concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for cotton.

Agr. Econ. 876 (SM-14)

Okla.

Marketing Practices and Harvesting Methods Affecting Cotton Quality and Net Income from Cotton in Oklahoma. To learn (1) cultural practices followed that affect cotton quality, quantity, price, and income from cotton marketed in Oklahoma, (2) effect of defoliation on cotton quality, price and income, (3) effect of harvesting methods used on quality and income, (4) effect of marketing practices followed, as type of vehicle used for hauling, (5) combined effect of pre-harvest field preparation, defoliation, harvesting methods and marketing practices on net income from cotton, per bale, acre, and farm.

Agr. Econ., Agron. 907

Okla.

The Physiology of Seedling Vigor and Cold Tolerance in Cotton. (1) Develop procedures in cooperation with plant breeders to select for cold tolerance and vigor in germinating seed, seedlings, and maturing plants. (2-5 To learn) (2) metabolic factors controlling the degree of vigor under cold conditions and how related to germination, to post seedling development, and vigor; (3) how phases of environment and nutrition affect these responses to cold; (4) effects of applied chemicals as growth regulators on cold responses; (5) by cooperating with pathologists, the relationships between seed reactivity and vigor and susceptibility or resistance to seedling disease organisms and see how use of fungicides affect such relationships.

Agron. 923

Okla.

The Mechanization of Castor Bean Production and Harvesting. (1) Learn principles of operation needed for successful castor bean harvesting and discover, design, and develop harvester components that adhere to principles, give special emphasis to entrance and gathering sections, mechanisms for revolving beans from stalk, seals to minimize seed before hulling, develop and make changes in equipment to harvest varieties that may be developed. (2) Continue work on hullers, placing emphasis on: service life of huller components, efficiency of hulling and of separation, more compact and simplified design, and combine hulling with harvesting. (3) Develop planter seed boxes that will meter seeds accurately. (4) Learn best placement for fertilizer in relation to bean seed for maximum responses and develop fertilizer placement machine. (5) Survey health hazards from bean seed and dust and incorporate mechanical contrivances for minimizing this hazard into the design of machines for production and harvesting of beans.

Agr. Engin. 924, coop. USDA

Oreg.

Control of Mint Rust, Puccinia Menthae. To develop a control of mint rust using one or more of the following: sanitation, application of fungicides, production and selection of resistant strains, determination of possible weed hosts, determination of weak spots in life cycle of P. menthae as a means of control.

Bot. & Pl. Path. 64-6, coop. USDA

Pa.

Agronomic Aspects of Improvement of Yield and Quality of Pennsylvania Tobacco. To (1) study rotations, fertilizer applications and other soil management practices to increase yields and quality of cigar filler tobacco, (2) determine specific factors and combination of factors which improve yields and quality of cigar filler tobacco, (3) investigate new materials to stimulate growth of tobacco plants in seed beds, and control suckers on the growing plants, and (4) study techniques of harvesting to improve quality and reduce losses of the crop.

Agron. 1244-A, coop. USDA

- P. R. The Response of Tropical Plants to the Application of Plant Growth Regulators. To determine effect of foliage sprays with maleic hydrazide and other growth regulators on suckering of tobacco, sprouting of root crops, flowering of coffee and vanilla and on other crops where hormonal regulation might be of value.
Pl. Phys. 23
- P. R. Factors Affecting Seed Germination Under Tropical Conditions. (1) Learn how germination capacity of seeds produced in Puerto Rico is influenced by changes in environmental factors during production and conservation. (2) Develop better techniques of seed production and conservation to secure maximum percentages of germination of seeds used for crop production.
Pl. Phys., Agron. 25
- P. R. Control of the Sugarcane Moth-Borer, Diachtraea Saccharalis (Fabricius) in Puerto Rico. To determine (1) usefulness and effectiveness of insecticides, in control of sugarcane moth-borer; (2) proper time, intervals and number of applications of insecticides for effective borer control; and (3) minimum dosages per acre of insecticides to be applied in fields for an economical and effective borer control.
Entom., Agron., Hort. 35
- P. R. Sugar Cane Breeding. To develop by hybridization new and superior varieties of sugar cane resistant to mosaic and other diseases.
Pl. Brdg. 38
- P. R. Microbiological Studies on the Utilization of Molasses. To (1) search for new strains of microorganisms that better satisfy needs of alcoholic, lactic, citric, and acetic fermentations; (2) produce, thru artificial hybridization, new strains of yeasts that will move efficiently carry out alcoholic fermentation, yielding products of higher quality than the presently used strains; and (3) determine optimum conditions under which microorganisms used for the above fermentations would carry out desired transformations.
Rum Pilot Plant 57

- P. R. Tobacco Marketing in Puerto Rico. To (1) ascertain various methods and systems of marketing Puerto Rican tobacco; (2) analyze existing market organizations in terms of local and port facilities; methods of receiving, classifying, and processing leaf, sale outlets and other services essential in moving crop marketward; (3) evaluate various tobacco marketing organizations and techniques used as to relative economic advantages; and (4) appraise major problems of selling tobacco to distributors and manufacturers by classification and ultimate use.
Agr. Econ. 60, coop. USDA
- P. R. Tobacco Breeding. To obtain cigar-filler and chewing types of tobacco resistant to tobacco-mosaic virus, Marmor tabaci Holmes, and adapted to Puerto Rican conditions.
Agron., Tob. 62
- P. R. Control of Diseases of Tobacco by Seedbed Sanitation. To learn if tobacco disease control in the seedbed is economically feasible, and if fumigations and disinfection of seedbeds and reduction of weed population in the seedbed are practical means of reducing diseases of tobacco following transplanting to the field.
Pl. Path., Tob. Sta. 64
- P. R. Marketing of Sugar in Puerto Rico. To determine (1) nature and importance of various items of expense incurred in marketing sugar; and (2) influence of certain factors of organization and operation upon efficiency of sugar marketing.
Agr. Econ., Sociol. 75
- P. R. Effects of the Quota System, Surplus Allocation, and Price Control with Governmental Subsidy and Incentive Payments Upon the Sugar Industry and the Economy of Puerto Rico. To measure and appraise (1) effects of quota system, surplus allocation and price control with governmental subsidy and incentive payments upon supply, consumption, price, and gross income for sugar; (2) effects of sugar program in terms of concurrent changes in farm enterprise combinations, market systems, and interrelations of product and factor prices for sugar; and (3) impact of policies on the economy at large.
Econ. & R. Sociol. 24 (SM-14)

P. R. Effects of Federal and Commonwealth Programs
Upon the Tobacco Industry and the Economy of Puerto
Rico. To (1) measure and appraise effects of Federal
and Commonwealth programs upon a. supply, consumption,
price, and gross income for tobacco, and b. concurrent
changes in farm enterprise combinations, market
systems, and interrelationships of product and factor
prices for tobacco; and (2) study interconnections of
these programs for tobacco with programs for other
farm commodities important in Puerto Rican agriculture
and examine interaction of their effect.

Econ. & R. Sociol. 85 (SM-14)

P. R. Factors Affecting the Sucrose Content of Cane.
To determine (1) and statistically evaluate factors
in sucrose content of cane, and (2) possibility of
controlling in a practical way the sucrose content
of cane.

Soils 91

P. R. Effects of Federal and Commonwealth Programs
Upon the Sea Island Cotton Industry and the Economy
of Puerto Rico. Measure and appraise effects of
Federal and Commonwealth programs upon: supply,
consumption, price, and gross income for Sea-Island
cotton; concurrent changes in farm enterprise
combination, market systems, and interrelationships
of product and factor prices for Sea-Island cotton.
(2) Study interconnections of program for above with
other programs for either farm commodities or farm
practices important in Puerto Rico, and examine their
interactions.

Econ. & R. Sociol., Agron. 96 (SM-14), coop. USDA

S. C. Breeding of Sesame. To develop and test desirable
indehiscent and even-maturing varieties of sesame with
emphasis on (1) adaptability to mechanized production,
(2) resistance to diseases (Fusarium wilt and
Cercospora leaf spot), and (3) adaptability to climate
and soils of the Southeast.

Hort., Agr. Engin. 19 (S-9)

- S. C. Cotton Seedling Diseases, and the Etiology of Boll Rots as Related to the Quality of Seed and Fiber. To (1) develop seed and soil treatments that will assist in obtaining adequate stands of seedlings; and (2) study etiology of boll rots as related to seed and fiber quality, and their possible control thru cultural practices.
Bot. & Bact. 1
- S. C. Relationship Between Potassium, Sodium, Calcium, Magnesium, and Some of the Minor Plant Nutrients in the Growth of Cotton, Oats, Lespedeza, and Certain Other Crops Grown on Various Soil Types. To determine (1) reciprocal relationship between K, Ca, Na, Mg, and other nutrients in growth response of crops at varying pH levels; (2) reciprocal relationship between application of these elements and chemical analysis of plant materials from same plots; (3) minor element response on selected soil types; and (4) some soil and crop conditions under which greatest response from these elements are obtained.
Agron. 5
- S. C. Harvesting Cotton Mechanically in the Piedmont and Coastal Plains Areas of South Carolina. To (1) evaluate and improve a. machines and methods for preparing the cotton crop for mechanized harvest, and b. machines and methods for mechanical harvesting, (2) evaluate mechanical harvester performance in relation to plant characteristics, and (3) investigate possibilities of removing the cotton from the plant by principles other than the conventional ones now being used.
Engin. 10 (S-2), coop. USDA
- S. C. Boron Fertilization in Relation to Yield and Quality of Crops. To (1) determine most suitable forms and rates of boron to add to general mixed fertilizers so they will supply boron needs of most crops without harmful effect on more sensitive plants; (2) availability of boron compounds to plants and residual effect on soil of major soil series; (3) evaluate effect of boron on yield and quality of crops; and (4) study effect of boron on absorption of other nutrients by plants.
Agron. 13

- S. C. Costs and Efficiency in Marketing South Carolina Cotton. To (1) examine in typical markets relationships between prices paid to producers and those prevailing in central markets for comparable size lots and quality; (2) evaluate different markets with respect to extent which prices paid to farmers reflect central market price; (3) investigate adequacy of price information; and (4) determine services rendered and marketing costs in marketing South Carolina cotton.

Agr. Econ. 40 (SM-1)

- S. C. Food Value and Utilization of Sesame Meal.
To (1) determine vitamin content and general composition of sesame meals produced in various ways; (2) develop new recipes in which sesame meal is incorporated; and (3) determine desirability of incorporating sesame meal into bread and other foodstuffs.

Nutr., Home Econ., Chem. 67

- S. C. Effect of Chemical Composition of Irrigation Water on Yield and Quality of Truck Crops and Tobacco.
To learn (1) chemical composition of various sources of water used for irrigation and its relation to local soil and geological conditions, (2) effects on yield and quality of truck crops of chemical composition of water used by sprinkler method, (3) effects on yield and quality of tobacco of ions present in water used by sprinkler method, (4) effects on soil properties of chemical composition of irrigation water.

Agron., Chem., Soils 84, coop. USDA

- S. Dak. The Breeding and Testing of Soybeans, Sunflower, Safflower, and Castor Beans for South Dakota. To (1) develop and test new strains (as in title) especially adapted to South Dakota; (2) locate new sources of earliness, drought, disease and insect resistance, and quality for use in breeding superior varieties; (3) cooperate with stations of adjacent states and USDA by participating in conferences and exchanging breeding materials and information on improved methods, techniques and varieties; and (4) study fundamental problems of breeding behavior of these crops.

Agron. 148, coop. USDA

Tenn. Factors Affecting Cotton Prices in Local Markets. To determine effectiveness of various local markets in reflecting to farmers the average price level prevailing for cotton, and in reflecting central marketing premiums and discounts in accordance with variations in quality.
Agr. Econ., Rur. Sociol. 8 (SM-1), coop. USDA

Tenn. Production of Burley Tobacco. To study (1) influence of soil type and fertilizer, manure, and liming treatments on yield and quality of leaf, (2) effects of preceding crops and length of crop rotation on yield, quality, and disease control, (3) hybridization and selection, with special regard to disease resistance, for strains better adapted to Tennessee conditions, (4) influence of curing conditions on quality of leaf, and (5) effect of cultural practices on yield and quality.
Agron. 37, coop. USDA

Tenn. Production and Improvement of Cotton Varieties Suitable to Tennessee Conditions. Improvement by (1) selection of established varieties, (2) crossing standard upland varieties, and (3) hybridizing between long-staple and upland varieties.
Bot. 79, coop. USDA

Tenn. A Study of the Insects Attacking Legumes, with Special Reference to Alfalfa and Soybeans. To get a better understanding of insect populations on soybeans and alfalfa, and their relative importance on yields.
Entom. 96

Tenn. Possibilities of Farm Enlargement and Its Influence on Farm Organization and Returns under Varying Economic Conditions. To study (1) feasibility of combining farms into larger units, and (2) influence of wage rates and varying cotton prices upon farm organization and net income on various sized farms, using one or more specific price levels.
Agr. Econ., Rur. Sociol. 97, coop. USDA

- Tenn. A Study of the Life History and Means of Control of Insects that Affect the Growth of Cotton. To determine the harm done to the cotton plant in early stages of growth by thrips, flea beetles, root lice, plant bugs, and, in some years, boll weevil.
Entom. 98, coop. USDA
- Tenn. Rapid Methods for Measuring Lengths and Other Properties of Cotton Fibers. To determine (1) the adaptation of the photo-electric cell to the measurement of the length of lint in ginned cotton; (2) the value of the clamped-sliver-weight method for determining the final length statistic; and (3) to develop a rapid method of measuring fineness.
Physics 130
- Tenn. Development of New and the Improvement of Existing Instruments and Techniques for Measuring Properties of Cotton. To (1) develop instruments that will effectively utilize the "rapid methods for measuring physical properties of fibers"; (2) study and attempt to improve existing instruments; (3) develop and refine testing techniques.
Physics 131 (S-1)
- Tenn. Breeding Disease-Resistant Dark Tobacco. To breed disease-resistant tobaccos suitable for dark tobacco culture.
Pl. Path. 132, coop. USDA
- Tenn. Control of Cotton Verticillium Wilt. To (1) develop means to reduce loss from the disease by study of contributing environmental factors, determining range of the disease in Tennessee, differentiating incidences of Verticillium and Fusarium wilts, determining means of spread of causal organism, and developing cropping systems to restrict further spread and minimize losses where disease now exists; (2) study use of fungicides, soil fumigants, and antibiotics to reduce incidence of the disease; and (3) breed a Verticillium and Fusarium wilt-resistant upland cotton acceptable to Tennessee.
Pl. Path. 135, coop. USDA

- T. H. A Survey Study to Determine the Possibility of Utilizing Native and Introduced Tropical Plants as Industrial Sources of Gums, Pectin, Resins, Essential Oils, Useful Alkaloids or Fibers. To study (1) content of gums, pectin, resins, essential oils, alkaloids and fiber in tropical plant tissue and fruits; and (2) possible methods for commercial production of these products from tropical plants.
Soils and Agr. Chem. 620
- T. H. The Growth of Sugar Cane, *Saccharum Officinarum*, as Affected by Environmental and Other Factors.--
I. The Growth of *Saccharum Officinarum* as Affected by Environmental Conditions with Special Reference to Moisture. To (1) continue studies under the original project, 653, but using variety 32-8560 with the view of refining the concept of fitting crop growth to environment; and (2) to work out a formula for the control of moisture relations of sugarcane through irrigation based on the physiological status of plant in relation to atmospheric conditions, soil moisture, and fertilization.
Pl. Phys. 653-I
- T. H. The Growth of Sugarcane, *Saccharum Officinarum*, as Affected by Environmental and Other Factors.--
Physiological Factors Influencing Organogenesis (Development of Organs) in *Saccharum*. To determine physiological factors influencing development of vegetative and reproductive organs of certain varietal hybrids of *S. officinarum*.
Bot. 653.2
- T. H. Control of Insects of Truck Crops.-- 2. Beans.
To (1) determine biology and habits of insects of beans; (2) determine susceptibility of insects involved to most promising insecticides; (3) determine phytotoxic effects of different insecticides on beans; and (4) develop effective methods for controlling different pests involved.
Entom. 954.2

Tex.

Genetics of Qualitative Characters in American Upland Cotton. To make more exact genetic analysis of economic characters; usually inherited quantitatively thru (1) development of more multiple dominant and recessive genetic marker lines with simply inherited qualitative characters (known, or to be discovered), and (2) establish a series of lines in which specific chromosomes carry known qualitative characters.

Agron. 14

Tex.

Physiological and Biochemical Effects of Systemic Insecticides on the Cotton Plant. To (1) determine role of the plant in translocation, alteration and persistence of systemic insecticides, to better understand mechanics of distribution within plant of compounds involved; (2) investigate effect of systemics on plant development, defining dosage levels and conditions at which stimulation or phytotoxicity occurs; (3) determine effect of systemics on plant's organic and inorganic nutrition in relation to their insecticidal effectiveness; and (4) attempt to develop a concept of alterations in chemical structure or systemics which contribute to increased or decreased phytotoxicity.

Pl. Phys. & Path., Entom., Amend 428

Tex.

The Interrelations and Control of Insects Attacking Legumes and Cotton. To (1) determine effect of insect populations developed on legumes grown for seed and soil improvement upon abundance of injurious insects in cotton; (2) develop or discover cultural methods to control or modify insect injury to cotton from use of legumes for seed production and soil improvement; (3) determine relation of over wintering and abundance of thrips, spider mites, fleahoppers and aphids on wild winter and spring host plants in permanent and improved pastures and fence rows, roadsides, etc. to migration and abundance in seedling cotton; and (4) develop most economical control for these insects.

Entom., Agr. Engin., Agron. 557, coop. USDA

Tex.

Improvement of Peanuts Through Breeding and Selection. To (1) develop new varieties and strains of Spanish type peanuts with resistance to Southern blight, and *Cercospora* leaf spots, high yielding ability, uniformity of shape and size of seed, and seed dormancy; (2) increase emphasis on assembling and testing of new peanut breeding materials for a substantially higher order of resistance to major diseases; (3) conduct hybridization and selection within groups of new and old breeding materials in the direction of combining high disease resistance with other outstanding characteristics; and (4) use all available genetic techniques in reaching the above objectives, including chemical and radiological methods of modifying germ plasm.

Pl. Path. & Phys., Agron. 569

Tex.

Genetics and Improvement of Cotton. To establish sound principles and practices for improvement of cotton thru basic research in cytology and genetics by: (1) maintenance of the *Gossypium* species, interspecific hybrids and geographic races of *Gossypium hirsutum*, (2) cytogenetic studies on nature of species differences, and barriers, (3) cytogenetic investigations on effects of individual chromosomes within species and in derivatives of species hybrids, (4) development of marked stocks as an aid in cytological and genetical analysis, (5) evaluation of interspecific hybrids, polyploids, and primitive and foreign stocks with respect to their potentialities as sources of characters of economic importance, (6) genetic analysis of desirable characters in interspecific hybrids and in stocks derived from them, and (7) development of primary stocks which possess useful characters, or combinations thereof, not found in American Upland cotton.

Agron. 600 (S-1), coop. USDA

Tex. The Development and Improvement of Machines and Methods Used in the Mechanization of Cotton Production, Harvesting and Processing in Texas.

To design and improve machines and develop methods which will reduce manpower needs to a minimum and increase output per laborer to a maximum with respect to the growing of cotton by the evaluation and improvement of machines and methods.

Engin., Agron. 601 (S-2)

Tex. Diseases of Peanuts. To study major diseases of peanuts in Texas and develop practical measures toward their control.

Pl. Phys. & Path. 605, coop. USDA

Tex. Economic Aspects of the Mechanization of Cotton Production and Competing Enterprises in Selected Areas. To (1) learn effects and efficiency of certain desiccants and defoliants on yield and quality of cotton, (2) evaluate relative cost of harvesting cotton mechanically after using harvest-aid chemicals as compared with hand harvesting, (3) learn factors which contribute to successful use of mechanical strippers.

Agr. Econ., Pl. Phys., Path. 606, coop. USDA

Tex. Storage of Cotton Seed for Planting Purposes. To (1) determine effectiveness of different methods of aeration with forced air in maintaining high germination and in preventing increase in fat acidity value of cotton planting seed stored in large tanks; and (2) study air distribution systems and equipment and determine their effectiveness in cooling cotton planting seed when stored in large quantities.

Agr. Engin. 655

Tex. Patronage Patterns of Agricultural Producers in the Market. To (1) determine patronage patterns of agricultural producers in local market; (2) ascertain bases for patterns of behavior; and (3) interpret economic significance of patterns in terms of efficient marketing.

Agr. Econ., Rur. Sociol., RH:c-701, ES 202, coop. USDA

Tex. Influence of Cropping Systems on Crop Yields, Soil Improvement, and Conservation. To determine (1) effect of cropping systems on soil productivity in major farming areas, (2) information which can be used to formulate good cropping systems for each major problem area, (3) a procedure whereby a soil productivity balance can be arrived at for given soil and land conditions, (4) effect of good cropping systems on soil structure and air-water relationship, and (5) combined effects of all known positive practices on crop production for a number of soil and land conditions in Texas.

A. Cropping Systems for the Blackland Prairie, Houston Black Clay Soil (Class II Land). This experiment will be complete factorial for systems where cotton is used.

Agron. & Substa. 5. 719

Tex. Spraying Equipment for the Control of Cotton Insects and for Defoliation. To (1) improve spraying equipment in efforts to obtain better distribution of chemicals for control of pink bollworm; (2) determine nozzle type, arrangement and spacing to give optimum spray patterns for insect control including pink bollworm and for defoliation of cotton plants; and (3) check insect infestations to determine effectiveness of insecticidal applications with various types and arrangements of nozzles on booms and effects of chemical removal of foliage of cotton on full populations of insects, especially overwintering of pink bollworms in unharvested material.

Agr. Engin., Entom. 722

Tex. Development of Superior Cotton Varieties for Texas and Southwest Conditions. To develop cotton varieties with new or improved economic characters, or combinations of economic characters, using field performance, yield in particular, as the principal standard of comparison and selection.

Agron. 850, coop. USDA

Tex. -- Spontaneous and Induced Modification of the Gossypium Hirsutum Genome. To obtain basic information on the cytogenetics of Gossypium hirsutum, by following these problems: (1) effect of changes in chromosome number, especially effects of individual chromosomes as studied by their addition to, or subtraction from, the hirsutum genome, (2) effect of specific chromosomes or characters from Asiatic and wild diploid species transferred to the hirsutum genome, by addition or substitution, (3) detection of spontaneous and induced intra- and inter-chromosomal changes, and study of their transmission, (4) detection of gene mutations, spontaneous or induced by radiation or mutagens, (5) improvement of techniques of cytology and interspecific crossing needed for study of above problems, and (6) building of stocks with each chromosome marked with visible, transmissible cytological aberration.

Agron. 859

Tex. Mineral Nutrition of the Cotton Plant. To (1) obtain basic information on a. role of sodium in nutrition of cotton plant, b. interactions between sodium and major nutrient cations with special emphasis on calcium and potassium, and c. growth and development of cotton plant and changes in organic constituents as influenced by nutrient treatments; (2) study absorption, distribution and accumulation of magnesium by cotton and determine specific requirements of cotton for Mg in regards to amount, season, and supply of other nutrients; and (3) study influence of deficiencies and excesses of various nutrients on plant vigor, yield, and disease resistance.

Pl. Phys. & Path. 916, coop. USDA

Tex. Marketing of Cotton Planting Seed. To (1) survey sources of cotton planting seed and determine proportion supplied by each source to Texas growers; (2) determine kinds and amounts of cotton planted in areas to be studied, and when possible to relate information obtained to varietal recommendations; (3) determine supply of various categories of cotton planting seed and to relate these data to most efficient use of each type; (4) appraise various methods used for processing, storage and distribution of cotton planting seed and determine influence of various practices on farmers' preference and acceptance; and (5) evaluate present marketing procedures as to effectiveness in supplying good-quality seed of recommended varieties at a reasonable price.

Agr. Econ. & Sociol. 918 (SM-1)

Tex. The Relationship Among Insects, Insecticides, Weather and Host Plants in the Control of Field Crop Pests, with Special Reference to Cotton. To determine (1) effect of wind, rain, temperature, light, humidity, and dew, under controlled conditions individually and in combination, on the toxicity of various insecticides to specific insect pests; (2) effect of age, size and condition of growth of host plant on the toxicity of insecticides to plant pests; (3) speed of action of various insecticides to certain pests; and (4) effect of dosages and single and multiple applications on residual toxicity of insecticides.

Entom. 933, coop. USDA

Tex. Treatment Schedules for Control of Insects Attacking Cotton. To determine most economical schedules of insecticidal applications for control of cotton insects.

Entom. 934, coop. USDA

Tex.

The Seedling Disease Complex of Cotton.

(1) Extend and intensify existing knowledge of occurrence and importance of fungal pathogens of cotton seedling disease complex in terms of geography and soil type. (2) Establish standard physiological responses for principal species of complex, as: cardinal temperatures, growth on standard artificial and synthetic media, growth in soils of different levels of moisture and organic matter. (2) Develop system of seedling disease grades reflecting relative symptomatology on quantitative basis and adaptable to current statistical methods. (4) Evaluate in terms of disease grades, responses of major commercial varieties and representative genetic types of cotton to seedling disease complex in soils at controlled temperature levels. (5) Cooperate with existing programs in selecting for tolerance of seedling diseases within current material, or in adding tolerance by hybridization and selection. (6) Examine prior treatment of seed, as to fuzzy, reginned, acid-delinted or flamed, in light of possible predisposition to seedling disease. (7) Evaluate selected chemicals, applied to seed prior to planting or mixed in covering soil, as means of controlling losses from seedling disease.

Pl. Phys., Agron. 990, coop. USDA

Tex.

The Influence of Physiological Factors on the Expression of Parasitic Diseases of Cotton. To (1) study relation between organic and inorganic content of cotton seeds and their susceptibility to seedling diseases, (2) learn relationship between the supply of major and minor nutrient elements and resistance of cotton to bacterial blight, and (3) learn effect of increased concentrations of certain minor elements in cotton seeds on seedling disease resistance.

Pl. Phys. & Path., Agron. 1007, coop. USDA

Tex.

Flax Improvement. To (1) develop or discover new varieties of flax better suited to Texas than now available, (2) search for greater cold resistance among imported or domestic strains and hybrid material, (3) cooperate in testing domestic and imported strains for sources of disease resistance, cold resistance and agronomic characteristics of value in the program, (4) test rate and date of seeding, fertilizer needs of crop and cultural methods for flax, (5) cooperate in control tests of nematodes and insects which attack flax.

Agron., Pl. Phys. & Path. 1028, coop. USDA

Utah

Variability of Constituents of Sugar Beets as Influenced by Soil, Fertilization, Climate, Variety and Maturity. To learn (1) variation of constituents of sugar beets as a basis for calculating sample sizes adequate for pilot plant operations, (2) effects of soil, climate, variety, N fertilization, and harvest date on variability of beet constituents, (3) relationship of size and shape of beets and variability of constituents.

Field Crops, Pl. Phys. 447, coop. USDA

Va.

The Determination of the Minor Elements--Boron, Cobalt, Copper, Manganese, Molybdenum, and Zinc--In Certain Forage Plants from a Northern and Southern Area of the Coastal Plain Region. To determine (1) the minor elements--B, Cu, Co, Mn, Mo, and Zn--in plant samples from the two areas in Coastal Plain; (2) whether Co, Cu, and Mo meet minimum requirements as now accepted for animal nutrition; and (3) if any deficient areas exist in this region as shown by composition of the plants.

Agr. & Biol. Chem. 86012, coop. USDA

- Va. Investigation of Some Aspects of the Etiology and Control of Tobacco Root Rot Disease-Complexes. To investigate as many different aspects of the etiology and control of tobacco root rot disease-complexes as possible, in an effort to improve vigor, quality, and per acre yield of tobacco crop in the area as measured by per acre value of the crops.
Pl. Path. & Phys. 86013
- Va. Breeding Tobacco for Disease Resistance. To (1) develop thru breeding and selection, high yielding and high quality strains of flue-cured, fire-cured, and burley tobacco resistant to the major tobacco diseases, including black shank, Granville wilt, mosaic, root rot, and the nematode-root rot complexes, with attempt made to incorporate blue mold resistance into the best strains, and in the case of burley, to also include wildfire resistance; and (2) determine genetic behavior of resistance in tobacco to several diseases under investigation in order to predict possibilities from breeding with a high degree of certainty.
Pl. Path. & Phys. 86018, coop. USDA
- Va. The Effect of Soil Reaction on the Availability of Nutrients to Crop Plants-Manganese on Peanuts and Boron on Apples, and Physiological Factors Affecting the Maturity of Peanuts. Study of the physiological factors affecting the maturity of peanuts and the factors causing variability in yields from given treatments in different years.
Pl. Path. & Phys. 86027
- Va. Control of the Southern Corn Rootworm Attacking Peanuts. To obtain information on: (1) insecticidal effectiveness of new compounds and decreased concentrations of those now recommended; (2) insecticidal effectiveness of new formulations; (3) efficiency of insecticide-fertilizer mixtures compared to granulated and dust formulations; (4) insecticidal effectiveness of side dress applications compared with broadcast; (5) most effective application time; (6) effect of insecticide treatment on maturity of peanut crop; (7) soil persistence of insecticides for rootworm control; (8) amount of residue in peanuts after control measures; and (9) effect of palatability after control measures .
Entom. 86042, coop. USDA

Va. Soil-Plant Nutrient Relationships in Peanut Production. To (1) determine the optimum calcium-potassium ratio in the fruiting area of peanuts for the production of peanuts; (2) estimate the quantity of calcium and potassium adsorbed and released by soil constituents similar to kaolinite, montmorillonite, and muck, which may actually influence formation of peanut fruits; (3) compare several liming materials and gypsum as sources of calcium for peanut fruits; (4) compare the ability of peanuts with that of oats to utilize the less available forms of nutrients in the soil; (5) evaluate by correlation methods the relationship of the various forms of plant nutrients in the soil to peanut production; (6) investigate the feasibility of indirect fertilization of peanuts; and (7) study the phosphorus and nitrogen needs of peanuts.

Agron. 86049, coop. USDA

Va. Control of Insects Affecting the Production of Flue-Cured Tobacco. To (1) investigate the control of the tobacco flea beetle in plantbeds, on newly set plants, and on field tobacco obtained from a. sprays and dusts applied to foliage, b. chlorinated hydrocarbon insecticides applied in transplant water; (2) investigate hornworms from the standpoints of a. insecticides effective in controlling both hornworms and other insects on tobacco, b. certain biological and ecological studies, and c. control with new type black-light traps; (3) determine the effectiveness of systemic insecticides applied in transplant water in controlling the green peach aphid and flea beetle; (4) determine the effects of new and promising insecticides on the flavor and aroma of tobacco products; and (5) develop control methods for other tobacco insects if they should constitute a major problem.

Entom. 86054, coop. USDA

Va. Fertilizer, Variety, and Sucker Management as They Affect the Quality and Yield of Burley Tobacco. To learn (1) effects of different rates of N fertilizers, three methods of sucker management; and two types of varieties upon yield, grade, nicotine, and total alkaloid content of burley tobacco, (2) extent of interaction of rates of N fertilization, varieties and sucker management, as measured by yield, grade, and nicotine content of burley tobacco, (3) residual influence of different rates of nitrogen fertilization of burley tobacco on yields of wheat and red clover.

Agron. 86069

Va. Effects of the Price Support, Acreage Adjustment, and Surplus Removal Programs in Peanuts Upon the Price Relationships Between Peanuts and Various Competing Products. To (1) measure extent to which end-users modified their purchase and use of peanuts due to varying price relationships; (2) measure demand and price, income and cross-elasticities of peanuts and peanut products at end-use levels.
Agr. Econ. 86080 (SM-14)

W. Va. The Effect of Fertilizer Treatments and Cropping Systems on the Yield and Quality of Tobacco. To study (1) effect of various fertilizer treatments on yield and quality of tobacco; (2) effect of various cropping systems; and (3) comparison of value of tobacco produced with cost of fertilizer treatment.
Agron. 19, coop. USDA

Wyo. Use of Herbicides for Control of Weeds in Sugar Beets. (1) Screen and evaluate promising herbicides for control of weeds in beets. (2) Learn effect of chemicals upon yield and composition of beets. (3) Devise and develop a band method for field application of herbicides.
Agron. 608

Regional Projects

- S-1 Genetics and Cytology of Cotton. To (1) accumulate, maintain, evaluate and utilize cotton species, interspecific hybrids, races and genetic types; (2) produce interspecific hybrids and study their cytological and cytogenetic behaviour; (3) study the inheritance of quantitative and qualitative characters.
Cooperating stations: Ala., Ark., Ga., La., Miss., N. C., Tenn., Tex., N. Mex., Okla., USDA
- S-2 Mechanization of Cotton Production, Harvesting, Ginning and Cleaning. To (1) design and improve machines and develop methods which will reduce manpower requirements to a minimum and increase output per laborer to a maximum with respect to the growing of cotton; (2) design and improve machines and develop methods which will reduce manpower requirements to a minimum and increase output per laborer to a maximum with respect to the harvesting of cotton; (3) design and improve facilities and develop methods for improvement in the storage and handling of cotton with emphasis on mechanically harvested cotton; (4) design and improve machines and facilities for the ginning and cleaning of cotton, with emphasis on mechanically harvested cotton.
Cooperating stations: Ala., Ark., Ga., La., Miss., N. C., Okla., P. R., S. C., Tex., USDA
- SM-1 Regional Marketing of Cotton, Cottonseed and Cottonseed Products. To discover means of improving the quality and reducing the cost of services involved in taking seed cotton from farms and delivering the lint and seed to consumers.
Cooperating stations: Ala., Ariz., Ark., Ga., La., Miss., Mo., N. Mex., Okla., S. C., Tenn., Tex., USDA

SM-17

Effects of Fires on Cotton Ginning Costs. To determine (1) the effect of prevention devices and practices on the frequency and extent of gin fires, and related costs to ginners, (2) the relation of premiums for gin fire insurance to losses associated therewith, (3) the trends in types of and rates for fire insurance available to ginners, and (4) the legal limitations and regulations of fire insurance companies.

Cooperating stations: Ariz., Ga., Ia., Miss., Mo., N. Mex., Okla., Tenn., Tex., USDA

W-24

Improvement of Mechanical Production and Harvesting of Irrigated Cotton in the Arid and Semi-Arid West. To (1) develop or modify methods and equipment for planting, cultivating, and application of agricultural chemicals for cotton in irrigated soils; (2) determine the effect on mechanical harvesting efficiency of machine adjustments, harvesting procedures, defoliation, and other cultural practices; and (3) determine the desirable cotton characteristics for mechanical operations.

Cooperating stations: Ariz., Calif., N. Mex., USDA

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FEDERAL-GRANT RESEARCH
STATE AGRICULTURAL EXPERIMENT STATIONS

NOVEMBER 1956

FORESTRY

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

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CURRENT SERIAL RECORDS

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC- North Central, NE - Northeastern, S - Southern and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

FORESTRY

General

Fla. Evaluation of Introduced Plant Species and Varieties.

Screen foreign & domestic plant introductions for adaptations & use as forage & cover crops in state, & provide data on performance of newly developed field crops species & varieties.

Agron. 767. S-9.

Minn. Studies on the Improvement of Minnesota Forest and Shade Trees. To (1) improve naturally regenerated stands through establishment of guides to the recognition of superior parents for seed production; (2) develop means of producing cheaper & more abundant sources of seed of superior strains; (3) develop information on seed sources and/or produce hybrids giving promise of providing superior planted stands that may a. grow more rapidly, b. produce better wood quality including such items as smaller knots, longer fibers, higher density, desirable sapwood-heartwood ratio, less taper, & shorter crowns, c. have better form for such purposes as sawlogs, piling & poles, Christmas trees, & windbreaks; d. show resistance to insects or disease, e. show resistance to drought or winter injury; f. possess desirable cone-opening characteristics, & g. produce higher yields of maple sugar; & (4) test introduced hybrids & species.

For. 1913.

Mo. Effect of Forest Cover on Soil and Water Resources.

(1) Hydrologic orientation: obtain, analyze, & interpret existing hydro-meteorological records to provide a sound basis for initiating & interpreting later, long-time studies on small drainage areas, (2) Soil Moisture studies: learn effect of timber cutting & surface soil condition on soil moisture, including observations of water table in shallow wells, interception of precipitation by trees & litter, evaporation & transpiration, all of which are variables in hydrologic equation, (3) Small watershed studies: determine influence of forest land-management practices on quality, quantity, & timing of runoff from paired experimental drainage areas including a regimen of streamflow from undisturbed forest areas during initial standardization period of several years, b effect of abusive watershed practices, c effect of restorative watershed practices.

Soils, For. 158.

Mo.

The Effect of Soil and Parental Material on Distributions of Native Ozark Timber Species. To determine (1) relationship of loess distribution to occurrence of shortleaf pine & post oak, (2) relationship of geologic parent material to shortleaf pine distribution, (3) shortleaf pine as an early phase of old field succession on residual soils derived from granites and porphyries, & (4) geologic interpretation of Clarksville Soil Series with reference to residuum and stratigraphy of the Roubidoux & Gasconade formations as they are related to forest types.

For. 260.

Texas

Private Forest Land Ownership in Commercial Forest Areas of East Texas. To (1) determine ownership patterns of privately owned forest land in selected areas of east Texas; (2) determine management practices by ownership classes; (3) analyze relationships between ownership classes & management practices, & why these practices are followed; (4) show complementary nature of forest management & use of land for crops & livestock in east Texas; & (5) interpret results in terms of needs for more widespread application of forestry practices so that public agencies may organize & carry out comprehensive program of forest management education.

Ag. Ec., Sec. 953.

Genetics & Breeding

Ala.

Some Physiological Characteristics of the Progeny of Selected Southern Pines and Their Interrelation with Nursery Practices, Survival, and Early Growth. To determine (1) certain genetic characteristics in progeny of superior, average, & inferior phenotypes thru chemical studies of mineral uptake & carbohydrate food reserves; & (2) relationships between initial survival & early growth of cut-planted seedlings & inherited physiological characteristics as modified by environment in the seedbed.

For. 551. S-23.

Conn.

Biochemical Processes Underlying Growth Regulation in Eastern Hemlock (*Tsuga canadensis*). To explore biochemical processes explaining effects of light and temperature on annual growth cycle of eastern hemlock; breaking of seed or bud dormancy, terminal and lateral stem elongation, and return to dormancy.

For. 420.

Ga. An Analysis of Certain Cytological and Anatomic Features of Phenotypic Variants, Races and Hybrids of Southern Pine Species Which May Aid in Selection of Breeding Stock. To (1) determine reliability of certain anatomical features of phenotypic variants of each species in wild stands as criteria in selection and breeding superior trees; (2) compare anatomical characteristics of selected parent trees of each species with those of their progeny; and (3) determine chromosome numbers of phenotypic variants, races and hybrids of each species.
For. 80. S-23.

Ga. Tree Breeding and Genetics. (1) To understand & delineate morphological, anatomical, & physiological characteristics of trees so that value is recognized in a breeding program. (2) Maintain a breeding program to produce high yielding & high quality trees. (3) Study heredity of characters in trees & physical bases of their inheritance.
For. 327. S-23.

Mass. Effects of Antibiotics and Organic Fungicides, Especially the Newer, on the Survival, Rooting, and Subsequent Growth of Cuttings of Nursery Stock and of Eastern White Pine. Learn how best to use antibiotics & organic fungicides, especially new organic fungicides, for treatment of cuttings of nursery stock, i.e., trees & shrubs, & Eastern white pine, so as to increase survival & improve rooting of cuttings.
Bot., For. 19.

Mass. Ecological Succession on Abandoned Farmlands in Massachusetts. To study vegetational changes on abandoned farmlands in central Massachusetts for (1) ascertaining the stages of plant succession on woodland pastures, abandoned orchards and land previously under cultivation, (2) learning the pattern & rate of vegetational change associated with the various degrees of these cultural uses, & (3) correlating effect of land use & other environmental disturbances, and edaphic & climatic factors with the development of forest vegetation within a single physiographic region.
For. 77.

Minn.

A Study of the Effect of the Source of Seed upon the Growth, Development, and Habits of Native Tree Species. — A. A Study of the Effect of Source of Seed and the Influence of Insects upon the Growth, Development, and Habits of Jack Pine (Pinus banksiana Lamb.). To study (1) effect of climatic conditions upon growth, development and hardiness of jack pine from various portions of its range; (2) effect of form of parent tree upon the progeny; (3) variations in seed value from different portions of trees range; (4) whether the characteristics of opening cones annually on trees is inherited; and (5) influence of insects, such as tip moth, pitch nodule makers, sawfly, midges and others, on form and development of tree and determine methods of control.

For. 1902.

N. J.

Germination and Planting Tests of Selected Ecotypes of Known Provenance of Scotch Pine and Untested Species of Spruce and Fir. To grow (1) Scotch pine seedling stock from native and European stands in the determination of superior strains for Christmas trees; (2) seedling stock of untested species of spruce and fir from selected seed of known origin in the determination of superior species for Christmas trees.

For. 305. NE-27.

N. C.

Selection and Testing of Certain Pine Species for Desirable Qualities. (1) Locate & catalogue desirable selections from wild populations & existing populations. (2) Vegetatively propagate such selections. (3) Progeny-test selections using open-pollinated seed. (4) Progeny-test selections using control-pollinated seed.

For. 70. S-23.

Tenn.

A Study of Forest Tree Species Adapted to the Cumberland Mountain Area of Tennessee. To (1) determine best adapted species for several soil and physiographic forest sites in Cumberland Mountain area; and (2) investigate best adapted species to plant on strip-mine coal lands.

For. 49.

Texas

Improvement of Certain Characteristics of Growth, Form and Wood Qualities of the Southern Pines by the Application of Genetic Principles, with Emphasis on Loblolly Pine. To: (1) develop a strains of drought & heat hardy pine, b methods of vegetative propagation from mature trees, especially loblolly pine, for use in genetic tests; (2) determine a role of genetics & environment in producing wood of high & low specific gravity, b methods best suited for mass production of seed of improved strains & hybrids of southern pines, c best methods of collection, extraction, storage & testing of pine pollen, d value & genetic character of outstanding nursery seedlings; (3) locate & test superior phenotypes to see if they are genotypically superior; (4) test geographic strains of major southern pine species.

Gen. 1009. S-23.

Establishment

Mass. Natural Regeneration of Eastern White Pine From Seed. To develop better techniques for reproducing stands of eastern white pine thru control of cutting & the treatment of seedbeds.

For., Bot. 76.

Mass. Studies in Metabolism of Coniferous Tree Seed During Germination. Learn more about respiratory ratios, dry weight decrease, & rates of carbon dioxide evolved during germination of forest tree seed.

For. 76 Sup.

Mo. Forestation. -- Site Adaptability of Timber Species. To establish a tier of 10 plots, each one chain square, in that part of the Daniel Boone Memorial Forest known as Razor Hollow, with spacing of 6x6 feet, giving 121 trees per plot, using species Taxodium distichum (L.) Rich., Populus deltoides Bartr., Juglans nigra L. Morus rubra L., Maclura pomifera (Raf.) Schneid., Liriodendron tulipifera L., Liquidambar styraciflua L., Platanus occidentalis L., Robinia pseudoacacia L., and Catalpa sp.

For. 157-e.

Mo. Ecological Studies in Forestry. -- Acorn Production. To secure data on more species, a greater number of trees of each species, and expand the work to cover additional areas.

For. 123-a.

Neb. Nebraska Tree Plantation Survey -- Pilot Phase.
Establish satisfactory sampling intensity & recording procedures to obtain (1) data needed for tree plantings in accordance with good conservation & land-use practices; (2) data from existing plantations of all types & ages by sites & species which will be useful in planning future tree planting operations. Measure site factors important in determining success or failure. Correlate tree species behavior with site conditions & learn major site factors limiting establishment & growth of species. Evaluate effectiveness of plantings.

For. 504.

Neb. Effect of Interrupted Dark Period on Seedling Growth of Three Conifers. (1) Learn vegetative growth response of *Pinus ponderosa*, *P. nigra*, & *Juniperus virginiana* seedlings when grown under conditions of: 14 hour day-length with dark periods interrupted by light periods while growing under controlled indoor temperature; normal growing season day-length with dark period interrupted by light while growing in "out-of-door" environment. (2) Learn cumulative effect of growing same seedling thru two or more seasons of similar treatment. (3) Compare under field conditions first year survival & growth of planting stock produced by these methods with ordinary nursery stock.

For. 526.

N. H. Site Preparation for Reproduction of Eastern White Pine. To learn (1) effectiveness of site preparation in germination & establishment of white pine as compared with no site preparation, (2) relative effectiveness of a number of site preparation methods, (3) proportion of white pine seed lost to birds & rodents under unprotected conditions, (4) micro-climatic differences existing under various site preparation treatments involved in study.

For., Agron. 104.

N. C. The Influence of Fire on the Regeneration of Pond Pine. To (1) investigate effect of intensity of burn on seedling establishment; (2) determine effect of logging before or after fire on regeneration; (3) study survival qualities of seedlings in several types of ground cover; & (4) investigate relative regeneration on burned and unburned cover.

For. 20.

W. Va. Animal Repellants on Hardwood Forest Plantations.
To determine (1) extent of wild animal injury to hardwood forest plantations on spoilbanks and in other locations, (2) extent of protection given by chemical repellants, (3) optimum time and frequency of application of repellants, and (4) cost of application of repellants on hardwood plantations of young trees.
For. 56.

W. Va. Factors Affecting Natural Regeneration in Upland Oak Types. To (1) test various types of reproduction cuttings in evenaged and unevenaged upland oak stands on various sites, in order to determine which methods of cutting are most applicable to obtaining oak regeneration in these forest types; (2) determine most important species of harmful & beneficial insects affecting natural regeneration of upland oaks; & ascertain nature of some of their ecological relationships to the forest; & (3) determine effect and relative importance of rodents & animals other than insects, depth of litter, & compactness of surface soil on viability & germination of acorns.
For., Pl. P., Bact., Ent. 46.

Management

Ala. Effect of Various Forest Situations and Practices on the Growth and Value of Forest Products and Returns from Forest Lands in Alabama. To (1) investigate factors that affect establishment, development, composition, & growth of forest stands & yield of products; (2) improve tree quality & rate of growth by selecting & developing superior seed sources; (3) develop improved methods of forest protection against fire, disease, & insect attacks; & (4) evaluate economic aspects & applying accepted and new forest practices.
For. 411.

Ala. The Establishment, Growth and Yield of Forest Plantations in Alabama. To determine effect of certain site factors, especially soil, on the establishment, growth, and yield of commercial tree species already planted and to develop specifications and instructions for planting such species under the site conditions existing in the State.
For. 509.

- Ark. Studies in the Economy and Application of Silvicultural Practices. To (1) determine practices suitable for regeneration of farm forests and timber stands, (2) study factors affecting survival, vigor and growth of forests, and (3) study forest land use factors affecting farm forests.
For., Hort. 216.
- Conn. Forest Succession on Abandoned Agricultural Lands and Farm Woodlots. Investigate succession in relation to climatic life zones, to varying soils & topographic features within each zone & to disturbance history regardless of type or location.
For. 422.
- Ga. Effect of Stand Density upon Growth, Mortality, and Economic Returns from Sapling Loblolly Pine Stands. Investigate (1) reduction of sapling pine stands in order to establish density for optimum growth, (2) economics of thinning sapling stands.
For., Ag. Ec. 104.
- Ill. The Establishment, Culture, and Development of Forest Plantations in Central and Northern Illinois. To determine (1) tree species best adapted to forest planting; (2) best methods to establish plantations on various sites and their costs; (3) growth rate of plantations; and (4) best cultural practices in weeding, pruning, and thinning plantations.
For. 50-301.
- Ill. The Volume, Growth and Yield of Important Farm Forest Timber Types in Central and Northern Illinois. To determine (1) timber resources of Illinois, (2) best cultural practices for important forest types, and (3) current growth rates and growth potentials of important forest types.
For. 55-302.
- Ill. Growth and Development of Native Hardwood Stands and Pine Plantations as Related to Certain Environmental and Site Conditions. To (1) work out site index curves for both hardwood and pine on basis of site factors; (2) establish timber productivity classes for important soil types or series; (3) study growth of various species in relation to factors that affect availability of soil moisture; & (4) investigate relation between site & mineral content of foliage of both pine & hardwood species.
For. 55-341.

- Ind. Woodland Management on the Southern Indiana Forage Farm. To (1) determine growth of residual stand & response in regeneration, following logging; (2) regulate & improve volume & quality of growing stock; & (3) devise & use method for keeping adequate production & marketing records for forest products.
For., Ag. Ec. 691.
- Ind. Silvicultural Management of Indiana Farmwoods. To (1) determine effects of intensity of cutting upon natural regeneration of farmwoods timber; & (2) relate silvicultural & economic aspects of various intensities of cutting of farmwoods timber.
For. & Cons. 699.
- Ind. Fertilization of Christmas Trees. To determine effects of fertilization on Christmas tree foliage color.
For., Cons., Agron., Hort. 757.
- Kans. The Effect of Different Spacing on Survival and Growth in Forest Plantings. (1) Ecological study of shelterbelts planted in Kansas by Prairie States Forestry Project & other agencies. (2) Effect of different spacing distances on survival & growth of tree plantings. (3) Forestation studies of spoil banks in southeastern Kansas.
Hort. 433.
- Ky. Economic Appraisal of Farm Woodland in the Eastern Pennyroyal Area of Kentucky with Particular Reference to Comparative Values and Yields Contingent on Site and Stand Quality. To determine the desirability and profitability of adapting long-run management plans to various types of forest growth and site qualities.
Farm Econ. 27.
- Maine Management of Small Woodland Areas in Maine.
For. 1.
- Maine Tree Volume and Board Foot -- Cord Ratio Tables. (1) To prepare standard volume tables for the principal commercial species of trees common to Maine -- white pine, hemlock, spruce, fir, cedar, and the hardwoods including maple, yellow birch, beech, poplar, white birch, ash, and gray birch; (2) to prepare tables to show the ratios between the number of board feet per cord in different sizes of bolts and different sizes of trees.
For. 15.

- Maine. Increased Production of Northern White Pine in Maine. To increase the production of white pine in the State and thereby to increase the income from farm woodlands.
For. 16.
- Mass. The Culture of Coniferous Nursery Stock in Massachusetts. To (1) learn equipment, materials, & techniques of culture used in present-day forest nursery practice throughout the U. S.; (2) determine value of new materials (particularly herbicides) to production of forest nursery stock; & (3) investigate root-shoot ratios as they are influenced by spacing, fertilization, moisture & light.
For. 72.
- Mass. Forest Stand Improvement by the Use of Chemicals to Kill Inferior Trees. To test use of various chemicals to kill weed trees in Massachusetts' forests.
For. 73.
- Mass. Growth and Yield of Managed Forests. To study by means of permanent test plots the growth & yield of managed forests in Massachusetts.
For. 75.
- Mass. Effect of Moisture Availability on Growth and Development of White Pine Seedlings. Evaluate degree of availability of water to woody species over soil moisture range from field capacity to wilting percentage. Learn extent that metabolism & growth of seedlings are affected by decreasing soil moisture content in range from field capacity to wilting percentage.
For. 77 Sup.
- Minn. The Effect of Forestry Practices on Ruffed Grouse Population. To (1) determine ruffed grouse populations & the environmental factors affecting them, (2) learn grouse movements & their use of various forest coverts, (3) relate these two objectives to forestry practices.
Ent., Zool. 1732.
- Minn. Management of Southern Minnesota Hardwoods. To (1) learn the growing stock level which will give maximum production of quality, quantity, & value, (2) learn if even-aged or all-aged management is better in these stands, (3) learn what level of production can be expected under intensive management compared with present types of management, (4) discover how the quality of Minnesota hardwoods compares with that of hardwoods from other areas.
For. 1915.

Minn. Tree Species Adaptability and Growth on Southern Minnesota Farm Lands. (1) Establish site quality guides for tree planting in southern Minnesota, (2) Learn species & biotypes best adapted. (3) Devise planting stock quality guides & methods for securing required quality. (4) Study planting methods with reference to their influence on subsequent survival & growth. (5) Test introduced species & learn their suitability & desirability for southern Minnesota planting.

For. 1917.

Minn. Ecological Studies of Secondary Woody Vegetation. Study life history and successional ecology of major brush species to acquire knowledge fundamental to: the control, eradication or manipulation of brush populations toward desired land management goals; prediction of trends in forest succession necessary for planning for future use of forest and wildlife resources.

For. 1918.

Minn. The Effect of Soil Properties on the Regeneration and Growth of Important Tree Species. To determine effect various soil properties have upon natural regeneration & rate of growth of principal commercial species of trees in Minnesota, such as jack pine, white pine, Norway pine and quaking aspen.

Soils, For. 2518.

Miss. Development of Improved Management Methods for Hardwood and Pine-Hardwood Stands. Undertake to find answers to certain specific silvicultural and mensurational stand problems including 1. thinning in evenaged bottomland sweetgum stands; 2. relation of stand and site conditions to grub and ant damage in green ash stems; 3. ability of loblolly pine seedlings and small saplings on upland sites to overtop various density and species combinations of hardwood stems, sapling size and smaller, of seedling and sprout origin; and 4. an investigation of methods for relating stand characteristics to average stand form class.

For. HI-2

Mo. Ecological Studies in Forestry. A. Acorn production. B. Forest succession of the bottomland hardwoods in southeastern Missouri. C. Silvics of eastern red cedar. D. Effects of forest grazing.

For. 123.

Mo.

Christmas Tree Culture. To (1) continue selection and development of Christmas tree planting stocks, (2) continue records on site-adaptability studies with various species established between 1950 and 1951, (3) continue records on site-preparation study with jack pine started in 1950, (4) continue treatments and records on spacing-cultivation study with Scotch pine, (5) continue records and maintenance of planting method and mulching study with Scotch pine and Eastern white pine, (6) continue seedling grade study started at Ashland in 1953 using 2-0 Riga Scotch pine, 2-1 Scotch pine, 2-0 jack pine, and 1-0 jack pine, (7) continue pine tip moth control study, (8) observe, particularly in fall and winter, effectiveness on deer movement of 3 kinds of fencing erected in 1953 and early 1954, (9) continue measure of cumulative effects of deer and tip moth damage on Christmas tree yields of Scotch and jack pines, (10) continue pruning and shearing study of jack pine and Scotch pine for improvement of Christmas tree quality, and (11) study effects of mineral nutrients in various combinations on seasonal color of Scotch and jack pines.

For. 9.

Mo.

Reproduction and Forest Stand Improvement Cuttings.

To (a) revise literature, review manuscript & establish additional study plots in young natural stands at the Weldon Spring Experimental Farm and take first-year measurements after the 1953 growing season, and remeasure experimental plots on DuPont State Forest after 1953 growing season; (b) study stand diameter growth in a mixed oak stand which has been partially cut and also amount of reproduction and changes in species composition which develops in partially cut oak stands; (c) provide a means for harvesting the timber crop of the Weldon Spring Experimental Farm in order to meet the cutting needs as prescribed for experimental units and secure greatest economic return of resource thru selective marketing practices; (d) establish a series of 12 experimental plots, apply to them different stand improvement treatments, and secure and record all basic data needed as a foundation for this study; and (e) establish a set of plots on University Forest with possibly another set at Weldon Spring Farm, and cooperate with personnel of Poplar Bluff Ranger District and National Distillers Products Corporation in establishing by them a set of plots on their respective land.

For. 122.

Mo. Ecological Studies in Forestry - b. Forest Succession of the Bottomland Hardwoods in Southeastern Missouri. To (1) survey successional time sequence of bottomland hardwood types in the large bottoms of Mississippi, St. Francis and Black Rivers, with the hope of developing a sampling technique that will permit recording data on punch cards; and (2) establish permanent plots in Mingo Wildlife Refuge from which information on marsh-forest transitions can be evaluated.

For. 123-b.

Mo. Ecological Studies in Forestry - d. Effects of Forest Grazing. To make annual re-measurements of original 20 grazed and ungrazed plots at Weldon Spring in Stands 23 and 19.

For. 123-d.

Mo. Inferior Tree Species Control. To find an effective, economical method of eliminating low-value hardwoods from timber stands and preventing or minimizing their regeneration by sprouting.

For., Field Crops 166-a.

Mo. Effect of Stand Treatment on Growth, Seed Production, and Regeneration of Bottomland Hardwoods. (1) Learn effect of cutting methods and semi-controlled periodic flooding on growth, seed production and regeneration of bottomland hardwood species. (2) Learn silvical characteristics and requirements of bottomland hardwoods. (3) Investigate forest succession of bottomland hardwoods in southeastern Missouri as a means of interpretation of regeneration responses. (4) Develop tree classes for commercially important species.

For. 287.

Mo. Improvement of Low-Quality Understocked Hardwood Stands. To determine factors affecting the establishment, growth and development of commercially important trees in natural forest stands and in forest plantations.

For. 75.

Mo. Fire Studies. No new plots will be established during 1951-52. Work will consist entirely of maintenance work and maintenance of records on plots previously established.

For. 75-C.

Mo. Pruning of Oaks. Pruning study begun by Forest Service in 1937 will be investigated. Original pruned plots will be re-established in ground, growth data taken and sample trees dissected. Photographs will be taken from camera points established and dissected stems photographed. Another addition to present pruning study is planned which will vary slightly from original working plan. Two 2-acre plots will be established in which scarlet oak predominates. Crop trees will be selected and one-half of each plot will be pruned to 17 feet with pole saw. Cost and growth data will be kept according to working plan and camera points established.

For. 75-E.

Mo. Conversion of Low-Value Hardwood Stands to Conifers. To test the practicality of converting a blackjack-post oak ridge to various species of conifers, involving felling, girdling, and poisoning existing trees both before and after planting and seeding the conifers.

For. 75-g.

Mo. Use of Forced Air in Forest Fire Control. Develop a new type of fire fighting equipment, using forced air to move leaves and litter in building fire line.

For. 290.

Nebr. Study of Silvicultural Practices in Hardwood Woodlots of Nebraska. To study and develop methods of: obtaining desirable natural reproduction, obtaining reproduction by seeding and planting, weeding-out undesirable trees by removing, poisoning, or girdling. Study changes in composition and quality of Nebraska hardwood forests due to these practices. Provide foundation for study of economic aspects of woodland management in state by accounting of income and expenses.

For. 519.

N. H. Propagation of Woody Plants. To study factors affecting rooting, survival, and continued growth of cuttings of woody plants including Acer, Rubus, Corylus, Malus, and Syringa.

Bot., Hort. 44.

N. H. The Relationship of the Growth of White Pine in New Hampshire to Selected Environmental Characteristics. To determine variations in pattern of height and diameter growth of white pine as related to site, with particular reference to climatic, physiographic and biotic factors of the environment.

For., Agron. 70.

- N. J. Investigations of Christmas Tree Growing in New Jersey. To test, under New Jersey conditions, suitability of various species of conifers, and for each species, problems of spacing, rate of growth, length of rotation, need for and cost of shaping, possibility of reproducing from lowest whorl of branches and desirability of this method.
For. 301.
- N. J. Investigations in New Jersey Farm Woodlot Silviculture. To study how to (1) develop and maintain a woodlot margin which at the same time provides minimum competition for adjacent fields and produces well-formed trees; (2) diversify species of the woodlot as a precaution against epidemic diseases and insects and the markets as a means of increasing income; and (3) make an annual harvest in a small woods of species which are usually thought of as needing conditions of an even-aged stand.
For. 303.
- N. Y. Tree Plantations. To (1) determine best species to be grown on heavy upland soils; (2) investigate wide spacing of coniferous species, which may lead to large savings in plantation growing; (3) investigate fall planting so that heavy spring work may not prevent planting; and (4) investigate several unhealthy plantations of red pine which may be due to poor soil drainage.
Cons. 81-A
- N. Y. Windbreaks for Muck Land at Elba, New York. To determine if the presently used willow, Salix purpurea, can be successfully grown for windbreaks, when properly managed and disease free stock is used, and if the attempt is not successful, to find a substitute.
Cons. 96-C, 16.
- N. Y. Woody Brush Control. To determine the best methods of application, volumes and concentrations to use, and effect of dormant treatment in brush poisoning with the selective, hormone weed killers.
Cons. 96-E.
- N. C. The Effect of Drainage on the Production of Pond Pine. To study the effect of drainage in Hofmann Forest in order to determine (1) area on both sides of the ditch from which surface water is removed and if during growing season soil water table will fall to a level sufficiently low to permit good tree growth; (2) what changes will occur in soil as a result of drainage; (3) accelerating effect on diameter and height growth of forest stand; (4) changes that will occur in understory and ground cover as a result of drainage; and (5) changes in micro-climate due to changed growth conditions in forest stand following drainage.
For. RM-7.

- N. C. Optimum Intensity of Protection from Forest Fires. To determine optimum annual expenditures for fire control needed in 15 Tennessee Valley counties of North Carolina, information permitting in turn establishment of allowable annual burns within each county.
For., Ag. Ec., Stat. 32.
- Oreg. Comparison of Willamette Valley Foothill Lands for Use as Farm Forestry or Pasture. To obtain (1) physical and economic data for recommendations of best use of Willamette Valley hill lands for pasture or forestry, and (2) basic ecological data on effect of partial removal of tree growth vs. no treatment.
A. H., For. 160-7.
- Oreg. Forest-Soil-Site Relationships. (1. Soil Moisture and Temperature Relations on Cutover Forest Lands in Western Oregon as Affected by Plant Succession, 2. Soil Moisture and Temperature Properties of Pumice Soils of the Central Oregon Pine Region.) To (1) determine soil moisture and temperature relations on forest lands immediately after clear cutting and slash burning, (2) determine influence of plant succession on these soil moisture and temperature relations, (3) ascertain periods during plant succession when soil moisture and temperature conditions are most favorable for the establishment of tree seedlings, (4) learn the basic soil moisture characteristics of pumice soils, and (5) learn the trends of soil moisture and temperature conditions on pumice soils under different types of vegetative and surface cover conditions.
Soils 165.
- Pa. Forest Cutting Practices Affecting Deer Foods. To determine quantity of deer browse produced by silvicultural cutting practices.
For., Zool., Ent. 1057.
- R. I. The Study of Existing Rhode Island Forest Types in Relation to Their Rehabilitation by Silvicultural Techniques and Planting. Study existing forest tree types and associations and attempt to correlate these with site conditions, study rehabilitating burned forests, and determine effective and economically feasible ways of growing conifers on said lands.
For. 951.

S. D.

Selection of Adapted Species and Strains of Trees and Shrubs for South Dakota Farms and the Control of the Insects and Diseases that Attack Them. Horticultural Phase --- To (1) observe growth habits and adaptability of various strains and varieties of trees and shrubs in the state; (2) develop improved types by selection and hybridization; (3) perfect methods of propagating outstanding strains of trees and shrubs on a commercially applicable scale — including cottonwoods, hybrid elms, and Harbin strains of Chinese elm. Plant Pathology Phase — To (1) determine destructive effect and prevalence of tree diseases responsible for destroying important species within the state, their possible control and their host-parasite relationships; and (2) determine what effect cottonwood rust defoliation may have on winter hardiness and survival of susceptible species; and the environmental factors favorable to development and dissemination of this disease under field planting conditions. Entomology Phase — To (1) determine most important insect pests affecting various species and strains of trees and shrubs composing farm planting in South Dakota; (2) determine most practical methods of control of the pests; and (3) experiment with adequate control measures for insect pests found since 1944 on trees and shrubs.

Hort. 142.

S. D.

The Effect of Spacing on the Survival, Growth and Effectiveness of Windbreaks and Shelterbelts in South Dakota. To determine (1) spacing distance that best promotes tree survival, growth and longevity; (2) effect of spacing on soil moisture and nutrient supply in windbreak; (3) influence of spacing on wind reduction and snow accumulation patterns; and (4) cost of establishment and maintenance of each spacing design as a guide to finding an economic spacing consistent with maximum protection benefits.

Hort. 239.

Tenn.

Forest Management. Objectives are: 1. improvement cuttings; 2. fire protection; 3. secure maximum production thru weeding practices; and 4. economic returns for management practices as they apply to individual farms in Cumberland Mountain area.

For. 48.

Tenn.

Chemical Debarking of Post-Sized Hardwood Trees. Learn optimum date for applying sodium arsenite to freshly girdled hardwoods so as to get fastest debarking. (2) Treat posts from these trees by cold soaking in a preservative and compare to similar species peeled by hand or a chain peeler.

For. 93.

Vt. Factors Affecting the Periodic Sap Flow in Sugar Maple. Make studies responsible for maple sap flow as: histological, biochemical and physiological studies; (2) evaluate role of environmental factors affecting sap flow mechanism; (3) effect of genetical differences and tissue interaction on sap flow mechanism.

Bot. 40.

Vt. Factors Influencing the Growth and Yield of Sugar Maple Trees. (1) Evaluate producing trees as to sap quality and yield and develop methods for selecting high-yielding specimens. (2) Survey variability in young maples and study its relation to adult performance in stocks of known and unknown genetical composition. (3) Evolve sugarbush management practices for cut-over areas and abandoned fields, already supporting stands of young trees. (4) Study role of climatic conditions in influencing productivity.

Bot. 41.

Vt. Site-Tree Relationship as a Basis for Tree Selection for Higher Yields. To learn (1) soil types and forest sites in relation to rate of growth and tree form of principal timber producing tree species in state; (2) principal native timber producing tree species having best growth and tree form for various forest site conditions; (3) for principal native timber trees showing superior growth quality, the characteristics distinguishing individual trees to be favored, in application of forest management practices, for high timber production.

For. 47. NE-27

Vt. Classification of Coniferous Forest Tree Planting Sites Based upon Soil and Physiography. To develop a classification of potential productivity of coniferous forest planting sites in Vermont based on an analysis of soil and physiographic conditions which exist in established plantations.

For. 50.

Vt. Thinnings and Related Silvicultural Practices in the Development of Management Plans for Natural Seeded and Planted Coniferous Forests on Sandy Soils in the Champlain Valley. Learn (1) adaptability of exotic coniferous species in contrast to native species for planting on sandy soils not suited for agriculture; (2) most desirable management practices of establishment, thinning, pruning, improvement cuttings and pest control for native and exotic species; (3) changes in physical factors of site as planted and seeded areas develop from open field to closed stand; effect of management practices on site factors; and physiological response of trees thereto as expressed in quality & quantity of lumber produced.

For. 52.

Wash.

The Nature of Resistance to Fluoride Fumigation Found Among Ponderosa Pine, Prunes, Apricots and Gladiolus. (1) Correlate stomatal numbers, size, and position with reaction of Pinus ponderosa, Prunus armeniaca, Prunus domestica, and Gladiolus plants to fluoride fumigation. (2) Correlate cutical thickness, epidermal thickness and other morphological features of given plants with reaction of those plants by hydrogen fluoride. (3) Learn influence of 30 species of Prunus rootstock on response of four commercial prune varieties and four commercial apricot varieties to fluoride fumigation.

Pl. Path. 1322. W-39.

W. Va.

Efficient Forest Management Practices for West Virginia Cut-Over and Burned Over Hardwood Forest Lands. To determine (1) most effective and profitable silvicultural systems; (2) differences between liquidation cuttings and frequent fires and economic cutting practices and fire protection; and (3) costs and returns of various thinning, improvement and harvesting operations.

For. 49.

W. Va.

A Survey of Multiflora Rose Plantings in West Virginia, with Special Reference to Growth Characteristics and Spreading Tendencies. To (1) determine rate of growth which occurs under various site conditions and treatment with multiflora roses planted in W. Virginia; (2) collect all available data on values and effectiveness of multiflora rose as a living fence and wildlife cover and food; (3) secure information on objectionable characteristics of multiflora rose, particularly spreading and becoming a noxious weed; and (4) assemble data as a basis for setting up experimental plots on which research can be handled under controlled conditions.

For. 66.

W. Va.

Timber Management for the Market Demands in Southern West Virginia Forests. To determine timber product goals for southern West Virginia hardwood forest types; and to devise and test systems of management capable of producing desired timber and suited to needs of forest owners.

For. 31.

Disease Control

- Conn. Dutch Elm Disease and Its Chemotherapy. (1) Learn causes of dysfunction in wilt diseases. (2) Search for compounds to inhibit processes leading to dysfunction or kill the causal fungus. (3) Apply promising treatments to plants and measure their translocatability. (4) Test promising compounds for their efficacy in controlling Dutch elm disease. Bot., Pl. Path. 652. NE-25.
- Del. Dieback Disease of Oak and Some Diseases of Nursery Seedlings. To determine the etiology, epiphytology and control of (1) the "dieback" disease of oaks, and (2) the damping-off, root rot, and needle blight diseases in the conifer seedbed. Pl. Path. 57-D.
- Ill. Application of Measures for the Control of Oak Wilt in an Intensively Managed Forest. To test and demonstrate control measures thru intensive application and careful observation in a forest where oak wilt has been prevalent for many years. For. 55-351. NC-22.
- Mass. The Nature and Development of Tree Wilt Diseases. To learn: (1-4) pectic enzymes produced by Graphium ulmi and their role in disease production; identity and pathogenicity of various fungi and bacteria isolated from twigs of wilted trees; effect of weather on tree wilt disease; distribution of the A & B strains of Graphium ulmi. (5) Develop a technique for learning degree of resistance of a tree to a wilt without killing the tree. Shade Tree Lab. 110. NE-25.
- Minn. Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage. I. Soybeans, Corn and Cereal Crops. II. Potatoes and Other Vegetables. III. Lumber and Other Wood Products. IV. Fruits. Pl. Path., Bot. 2220.
- Minn. Epidemiology of Oak Wilt. To (1) study factors affecting formation and life span of mycelial mats; (2) investigate life cycle of oak wilt fungus, particularly production of inoculum; (3) find how this fungus can spread from tree to tree other than by root grafts; and (4) develop control measures based primarily on eliminating spores as a primary source of inoculum. Pl. Path., Bot. 2224. NC-22.

- Mo. Investigations on Oak Wilt. Study (1) distribution of disease in state; (2) plants affected and varietal susceptibility; (3) morphology, physiology, and pathogenicity of organisms; (4) mode of infection, growth of fungus in suscep, emergence of fungus from disease trees, dissemination, seasonal development, influence of environmental factors; (5) movements between hosts other than thru root grafts, role of insects and other vectors; (6) sanitation and/or isolation (effect on local spread and effect on long distance spread), vector control, resistance (selection and/or development of resistant varieties.)
For. 52. NC-22.
- N. J. Symptoms, Spread and Control of Canker Stain of Plane Trees. To gain on a regional basis and especially in New Jersey, information concerning symptoms and rapid method of diagnosis, relationship of borers to spread, life history of causal fungus, and means of control.
Pl. Path., Ent. 481. NE-25.
- Ohio Pathological Aspects of the Oak Wilt Disease. To (1) determine, if possible, the existence of Chalara quercina in fresh cut oak lumber, including white oak group and red-black oak group; (2) place logs and lumber under as many favorable conditions for the growth of Chalara and determine how long the fungus lives in cut logs and lumber; (3) determine whether the saw or any type of cutting machinery spreads the oak wilt fungus, and also whether the saw might carry the fungus into lumber from healthy trees; (4) determine if there are any methods by which lumber is piled that might keep the oak wilt fungus alive, and (5) test a series of treatments if the oak wilt fungus remains alive under any condition.
Bot., Pl. Path. 96-1. NC-22. Ent.
- Ohio A Study of Possible Vectors of the Oak Wilt Disease Organism. To (1) ascertain the species of insects, if any, that are attracted to Chalara mats; (2) if suspected vectors are found, determine if they carry the oak wilt organism either within or upon their bodies; and (3) find if they can transmit the organisms to healthy oaks.
Bot., Pl. Path. 96-3. NC-22.
- R. I. Study of the Mechanism of Symptom Development and Chemotherapy of Wilt Diseases, Particularly the Dutch Elm Disease. To (1) determine exoenzyme and hormone production by wilt pathogens in culture; (2) determine effect of these metabolites on host plants; and (3) evaluate chemicals which may serve as internal medicants.
Pl. Path., Ent. 602.

R. I. Abnormal Physiology and Control of Vascular Wilt Diseases of Trees. To learn (1) mechanisms of wilt induction by fungi in trees, investigations of enzymatic auxin and toxin action in vivo and in vitro; (2) how metabolic poise, carbohydrate level, and air-moisture content of stem tissues may affect severity of symptom development; (3) thru field chemotherapeutants (internal-acting medicants) selected by laboratory bioassay.

For., Pl. Path., Ent. 611. NE-25.

Wash. Symptoms and Effects of Fluoride Fumigation on Various Ornamental and Crop Plants. To determine (1) and record photographically the sensitivity of forest, ornamental, vegetable and agronomic plants to small quantities of atmospheric fluoride, (2) effects of exposure-period on plant response to small amounts of atmospheric fluoride, (3) rate and extent of fluoride up-build in plants exposed to fluoride-contaminated air, (4) fluoride content of forest, horticultural, and agronomic plants grown in Spokane area, and (5) by terminal and/or radial growth studies if any common fruit or ornamental tree species in Spokane area have been adversely affected by fluoride from local industrial operations.

Pl. Path. 1143. W-39.

Wis. Diseases of Forest Nursery Plants and Forest Trees and Methods for their Control. To study the cause and nature of diseases on old trees, on replacement trees, and on seedling trees.

Pl. Path. 569.

Wis. The Spread and Control of Oak Wilt. To further the understanding of the oak wilt disease, how the fungus operates, its spread, and its control by continuing current investigations, including: 1. local spread -- to clarify further tree-to-tree spread in local areas, emphasizing role of root-grafting in woodland stands of different age, composition, and density on different sites, and at different times of the year, and to determine significance of "adopted" root systems to maintenance of disease "reservoirs", to disease spread, to survival and growth rate in pure vs. mixed stands, to continuance of dominance or suppression, and to certain practices; 2. local control -- to improve and extend methods of local control, emphasizing use of improved chemicals and more efficient root cutters under different circumstances; 3. long-distance spread -- to enlarge studies on possible vectors of long-distance spread, stressing role of woodpeckers and squirrels; and 4. host-parasite relationships -- to determine factors both in culture and in the tree which influence the growth, viability and longevity of various fungus forms; to clarify further wilt mechanisms, and host response to fungus infections; and explain variations in these responses.

For., Pl. Path 895. NC-22.

W. Va. Decay as a Factor in Sprout Reproduction of Yellow Poplar. To determine prevalence and severity of decay as a factor in sprout reproduction of yellow poplar, to learn the organisms chiefly involved, their mode of entrance and rate and nature of decay development, and as a result of this work, to be able to recommend silvicultural treatments which will reduce to a minimum the incidence of decay.

For., Pl. Path. 54.

W. Va. Oak Wilt. To (1) determine whether oak wilt is present in West Virginia and extent of its presence if found; (2) determine cause, or causes, of dying of oaks in West Virginia; and (3) obtain information basic to further research on control of oak wilt if it is found in the state.

For., Pl. Path. 33. NC-22.

Insect Control

Ala. Biology and Control of Certain Insect Pests of Forests in Alabama. (1) Study and evaluate damage caused by more important forest insects in state. (2) Study certain phases of life histories and habits of important bark beetles and of pests of nurseries and seedlings. (3) Learn most practical method of controlling major insect pests of forest nurseries and established stands of seedlings.

Zool., Ent. 111. S-36.

Conn. Larval Migration and Defoliation by the Gypsy Moth. Learn critical environmental factors affecting gypsy moth larval migrations and how these migrations are related to differences in defoliation damages of resistant and susceptible forest sites.

Ent. 314.

Del. Improvement of Measures for Control of Insects Attacking Farm Woodlands and Nurseries. (1) Devise practicable ways for detecting presence, and for recording relative abundance of insect and allied pests damaging farm woodlands. (2) Learn effect of various ecological factors that might decrease or increase populations of any particular species.

Ent. 3-E.

Maine Wood Borers in Forest Products. To (1) determine species of borers in damaging cut logs and other forest products, and relative importance of species found; (2) work out life cycles and habits, for Maine, of species found to be most destructive; and (3) use acquired knowledge of life cycles as basis for research tests to develop effective controls for wood borers in Maine.

For. 79.

- Mass. Insects Concerned in the Dispersal of Dutch Elm Disease, with Special Reference to the Native (American) Elm Bark Beetle, *Hylurgopinus Rufipes* (Eich.). To (1) study habits and distribution of *Hylurgopinus rufipes* (Eich.), *Scolytus multistriatus* Marsham and other insects which may be vectors of Dutch elm disease fungus, *Ceratostomella ulmi* (Schwarz) Buisman, especially correlation between timing of their feeding habits and seasonal development of host trees when fungus invasion is most likely, so insecticides may be applied at most appropriate time; (2) test new insecticides for elm bark beetle control; (3) experiment with hydraulic sprayers and mist blowers and, when possible, helicopters and other new spraying equipment to determine effectiveness in covering tall trees with insecticides; (4) study effectiveness of most promising insecticides and spraying equipment in actually preventing elm trees from becoming infected with Dutch elm disease fungus over a period of 5 to 10 years; and (5) when necessary, and in cooperation with other departments, study toxicity to cattle of any insecticide that seems imminent of adoption by the public for Dutch elm disease control.
Ent. 53.
- Mass. Materials and Methods Which Promise Value in Control of Insects and Mites on Ornamental Shrubs and Shade and Forest Trees. Study value of newer insecticides and miticides, and applications for control of insects and mites on ornamentals and forest trees.
For., Ent., Hort. 56.
- Mass. Use of Insecticides to Prevent Borer Damage to Unseasoned Logs. Learn effectiveness of various insecticides and methods of application in preventing damage by wood boring insects to unseasoned logs and lumber.
Ent. 59.
- Mass. A Method to Minimize the Adverse Effect upon Tree Form of Attack by the White Pine Weevil. To compare (1) removal of all but one lateral branch in second-from-the-top whorl of branches with (2) retention of all laterals in this same whorl to learn effect of treatment (1) on subsequent development and straightness of a substitute main leader to take place of normal leader destroyed artificially to simulate attack by white pine weevil.
For. 74.

Mich.

A Determination of the Possibility of Controlling Certain Economic Insects by the Application of Chemicals upon or Near the Soil Surface. To devise methods of more certain and cheaper controls for some of the insects of fruit, forest nursery and nursery crops in general by determination of effect of various insecticides on or near the ground surface on insects spending a part of their life cycle upon or in the soil.

Ent. 28.

Minn.

Insect Pests for Forest and Shade Trees. -- A. Forest Management in Relation to Insect Pests of Plantations. -- B. Epidemiology and Control of Insect Outbreaks in Forests and on Shade Trees. -- C. Minnesota Forest Insect Survey. To (1) facilitate prediction of tree insect outbreaks before they develop to the point where it is too late to attempt control; (2) provide basic understanding of natural control agencies operating to terminate outbreaks and sometimes prevent them; (3) develop forest management procedures to reduce or eliminate losses resulting from insect damage; and (4) explore field of chemical control, both means of applying poisons to trees and use of newly developed insecticides.

Ent., Ec. Zool. 1706.

Minn.

Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage. -- III. Lumber and Other Wood Products. To determine prevalence and cause of discoloration of aspen wood, and to devise methods of prevention and control.

Bot., Pl. Path. 2220-3.

Miss.

Biology and Control of Certain Insects Affecting Forest Trees and Unfinished Forest Products in Mississippi. (1) Evaluate damage caused by insects previously listed. (2) Study life histories and habits of insects listed; and (3) effect of environmental factors on biology and damage caused by insects. (4) Develop control measures for these species applicable to nurseries, forests, woodlots and unfinished wood products.

Zool., Ent. HH-2, RRFH2. S-36.

Mo.

Taxonomy and Biology of Insects Attacking Acorns in Missouri. (1) Conduct systematic study of insects attacking acorns with emphasis on various species of nut curculios. (2) Investigate biology and ecology of insects attacking acorns.

Ent. 294.

P. R. Chemical Characterization of the Termite-Repellant Substance in West Indian Mahogany Wood (Swietenia mahogany). To characterize chemically the substance responsible for termite-repellant activity of mahogany wood.
Nutr., Ent., Biochem., Med. 83.

Lumbering

Ind. Comparative Analysis of Two Systems for Grading Hardwood Sawlogs. To compare (1) ease of application of 2 grading systems by "free Choice" requirements per log, and application to cut log and logs in standing trees; (2) 2 grading systems as to facility of understanding and retention; and (3) precision of 2 grading systems as to ability to forecast lumber grade yields, to measure errors of estimation.
For., Cons. 734.

Mo. Decay and Defect in Missouri Trees. To give foresters information on amount of decay commonly associated with external tree defects and on rapidity of spread of decay.
For. 75-F.

N. Y. The Adaptation and Development of Farm Equipment for the Efficient Handling and Processing of Diverse Products from the Farm Woodlot. To (1) promote sound woodlot management for more New York state farm woodlots; (2) increase cash income from farm woodlot; (3) enable farmer to harvest his woodlot crop with minimum of effort and time and with existing or adapted farm machinery; (4) provide more of farm's need of fiber and organic matter for litter, bedding and soil humus; (5) up-grade woodlot products by farm processing to create a more salable product with greater value; (6) provide higher standard of living for "hill" farmers; and (7) provide easily handled, cheap fuel in areas where oil and coal are high.
Ag. Eng., Agron., A. H., Poul. 41.

Economics and Marketing

Ala. Improving the Marketability of Southern Wood. Increase margin available to manufacturer of wood products by increasing use and value of products to consumer by: evaluating properties giving most to quality and value; developing new sizes, shapes, or forms for better use and marketability; making wood properties better competitor with other materials; improving fabrication for more efficient engineering designs.
Ag. Ec., For. 564.

Ala.

Alabama's Christmas Tree Market and Market Potential for Alabama Produced Trees. (1) Learn extent and general nature of market in State for Christmas trees by learning: number, kind, size and quality of trees marketed and trends; variations in methods of handling and merchandising; variations in wholesale and retail prices of trees by characteristics; problems among wholesalers and retailers with quality, durability, movement, etc. (2) Study consumer acceptance of trees in carefully selected markets. (3) Analyze above from view of improvements that can be made.

For., Ag. Ec. 567.

Calif.

Marketing Practices and Other Price Determining Factors for Logs and Stumpage. (1) Identify, describe and analyze factors influencing prices of logs and stumpage in a particular forest area. (2) Identify: principal buyers of these products in area, the market areas of individual buyers, and factors determining market areas. (3) Identify sellers of products in area, sources of market contacts available to sellers, and factors determining selection among market contacts. (4) Analyze changes of last five years in market forces, characteristics and influences identified. (5) Develop a concept of market applicable to observed conditions, establish criteria for delineation of market areas, and define market area of which study area is a part. (6) Learn possibility and usefulness of establishing an organized market information service for logs and stumpage under conditions of marketing and price determination.

For. 1711. WM-31.

Colo.

Marketing of Forest Products in Colorado. To learn (1) consumption of various types of forest products in state; (2) future consumption of types of forest products now in use, based on population gains and industrial development expected from present trends; (3) possibilities for increased use of wood grown in state to supply existing demands thru improved manufacturing and marketing; (4) opportunities for development of new uses for state grown woods, especially species now used under growth capacity; (5) extent of influence of marketing practices on management of private owners; (6) extent of influence of marketing and processing practices on consumers and processors.

For. 71.

Ind.

A Descriptive Study of the Markets and Marketing Services Available to the Woodland Owners of Indiana. To determine (1) markets existing for woodland products and the needs of these markets with respect to form of product and volume purchased annually by species and quality, (2) extent and frequency of product specification changes in primary wood-using industries, and (3) ways of sampling industry and specifications changes usable by extension foresters of the state.

For. 800.

- Ind. Production and Marketing Studies for Small-Saw-Mill Products. To determine (1) production and marketing practices of small sawmill industry; and (2) influence of various marketing practices on use of certain species and qualities of timber.
For. 704.
- Ind. Marketing Christmas Trees and Christmas Greens in Indiana. To (1) determine volume by species and source of Christmas trees and greens marketed in the state annually; (2) evaluate methods used for marketing native grown Christmas trees and greens and comparative advantages and disadvantages of various methods; and (3) determine potentialities of Christmas tree and greens market.
For., Ag. Ec. 766.
- Ind. The Contribution of Quality to Market Value Increment in Sawtimber Trees. To determine relative importance of quality change and volume growth as components of total increment in market value of sawtimber trees.
For. 798.
- Ind. Harvesting and Marketing Hickory in Indiana. Lear (1) state industries using hickory; form, quality and volume of products used; source of supplies and prices paid; (2) costs of cutting, yarding and hauling of primary products.
For., Ag. Ec. 825.
- Iowa Primary Markets for Native Timber in Southeastern Iowa. To (1) determine market situation for forest products in the section designated; (2) provide timber growers, primary manufacturers, and extension personnel with information on market situation; (3) indicate local sources of supply to secondary manufacturers in the state; and (4) point the way for farmers to accomplish savings thru custom sawing for home use.
For. ES 286.
- Iowa Secondary Markets for Wood in Iowa. To (1) investigate secondary wood-using industries of Iowa particularly as a market for primary wood producers, (2) investigate and learn feasibility of marketing products manufactured from low grade forest crops, woods, and mill waste for which a fully developed system of marketing channels is not now in existence, (3) bring up to date a directory, Wood Using Industries of Iowa, and (4) learn economic feasibility of establishing concentration yards between the primary and secondary manufacturers.
For., Ag. Ec. ES 454.

- N. H. Marketing Forest Products in New Hampshire. To determine (1) and describe present marketing agencies, practices and facilities in the State including particularly pricing policies at farm level; (2) adequacy of marketing facilities from standpoint of forest resources and effectiveness of channeling products to more practicable use; and (3) adequacy of forest marketing statistics and services, both public and private.
For. 82. NEM-6.
- Maine Marketing Forest Products in Maine. To determine (1) marketing agencies, practices, and facilities in the State, particularly pricing process at farm level, (2) adequacy of marketing facilities, their effectiveness in channeling products to the most practicable use, (3) adequacy of available forest marketing statistics and services both public and private.
For. 30. NEM-6.
- Md. Marketing Maryland Forest Products. To determine (1) and describe present marketing agencies, practices and facilities in Maryland; (2) adequacy of marketing facilities and market outlets, and their effectiveness in channeling products to their most effective use; (3) adequacy of available forest marketing statistics and services; and (4) need for, and feasibility of organizing cooperatives for marketing woodland products.
Ag. Ec. A-26-ah. NEM-6.
- Mass. Marketing Forest Products in Massachusetts. (1) To appraise adequacy of market facilities from standpoint of forest resources, and appraise effectiveness of marketing information in channeling products from small area woodland ownership to their most practicable use. (2) Learn adequacy of available forest market statistics and services both public and private.
For., Ag. Ec. 123. NEM-6.
- Minn. Improving and Increasing the Utilization and Marketing of Minnesota Hardwoods. — 1. The Utilization and Marketing of Low-Quality Aspen. 2. The Utilization and Marketing of Paper Birch. 3. The Utilization and Marketing of Other Hardwoods. To (1) increase present outlets for Minnesota hardwoods thru product improvement and marketing studies; (2) develop new uses and outlets for Minnesota hardwoods; and (3) obtain additional substitution of Minnesota hardwoods for our valuable and increasingly scarce conifers such as spruce and pine.
For. 1911.

Miss. Pulpwood Marketing in North Mississippi. To learn (1) present marketing facilities and practices in North Mississippi, (2) evaluate factors which contribute to unstable and sporadic nature of the market in North Mississippi.

For., Ag. Ec. FI-3.

Mo. Marketing and Processing of Hardwood Panelling. To determine (1) consumer preference for different grades, sizes and finishes of panels, (2) effects of different finishing materials and methods of applying these materials on appearance of panels, (3) effectiveness of different types of fasteners for holding panels in place, (4) best methods of manufacturing panelling, and (5) cost of producing panelling.

For. 259. NCM-17.

Mo. Marketing Christmas Trees. To (1) determine size and nature of Missouri Christmas tree market; and (2) test consumer demand and marketing techniques for Missouri-grown Christmas trees.

For. 245.

Mo. Economics of Timber Production. To determine factors of cost in the production of timber, and the net income which is derived from timber under different types of management, specifically: case studies of income from producing timber, growth and yield studies, taxation of forest land, and forest site evaluation.

For. 124.

Mo. Marketing the Timber Crop. -- b. Effect of Lumber Grading on Sale Value of Lumber. To (1) determine if sorting and selling sawed lumber by grade results in increased income to the small sawmill operator over selling on a mill-run basis; (2) determine reasons why lumber grading is not practiced by most sawmill operators at present; and (3) study nature and variations in grade-price differentials which may exist at selected local markets.

For. 120-b.

Mo. Marketing the Timber Crop. a. Preservation of Posts and Farm Timber. b. Effect of Lumber Grading on Sale Values of Lumber. c. Use of Defective Oaks.

For. 120.

N. J. Marketing Forest Products in New Jersey. To determine (1) and describe present marketing agencies, practices and facilities in the region, particularly treatment of pricing process at farm level; (2) adequacy of marketing facilities from standpoint of forest resources, and effectiveness in channeling products to most practicable use; and (3) adequacy of available forest marketing statistics and services both public and private.
For. 304. NEM-6.

Ohio The Market for and Marketing of Ohio Grown Christmas Trees. To learn (1) potential market for Ohio grown Christmas trees; (2) outlets used by Ohio growers, including prices received compared to prices received for trees imported into state; (3) reaction of dealers to Ohio grown trees compared to imported trees; (4) desirable size, species, and other characteristics as reflected by dealers; (5) regionality of demand of species of Ohio grown trees; (6) approximate number of Ohio grown trees marketed at present; (7) number being grown at present; (8) possible markets for boughs; (9) market potentialities for potted trees; (10) present mode of sale; (11) methods and cost of transportation.
Ag. Ec., R. Soc. 146. NCM-20.

Pa. Marketing Forest Products in Pennsylvania. To (1) investigate present marketing agencies, practices, and facilities in Pennsylvania, and determine pricing processes at farm level; (2) appraise marketing facilities from standpoint of maintaining and improving forest resources, and effect in channeling products to most practicable use; and (3) determine available public and private forest marketing statistics and services.
For., Ag. Ec., R. Soc. 1161. NEM-6.

Pa. Marketing Christmas Trees. To determine and evaluate marketing practices for Christmas trees, including: 1. supplies by age and species, 2. marketing practices including time and method of harvesting, preparation for market, and storage and transportation, 3. type of buyer and sale contract, 4. markets for Pennsylvania Christmas trees, 5. prices received for trees by markets and species, and 6. evaluation of effect of alternative marketing practices.
For., Ag. Ec., R. Soc. 1228.

Tenn.

Marketing Forest Products. -- Practices of First Buyers and Producers of Forest Products in Tennessee. Describe the marketing system and practices for forest products; determine how effectively forest marketing needs of producers are being met; investigate ways of improving forest marketing practices of producers and first buyers if inadequacies in present marketing system become apparent.

For. Mgmt., Ag. Ec. 75.

Vt.

Marketing Forest Products in Vermont. To determine (1) present marketing agencies, practices and facilities for forest products from small woodland areas in Vermont, including particularly a treatment of pricing process at farm level; (2) adequacy of marketing facilities from standpoint of forest resources, and effectiveness in channeling products to their most practicable use; and (3) adequacy of available forest marketing statistics and services both public and private.

For. 57. NEM-6.

Wash.

Improving the Market of Washington Farm Woodlot Products. To determine most profitable alternatives of where and how to market farm woodlot products.

For., Ag. Ec. ES 307.

W. Va.

Marketing Forest Products in West Virginia. To determine (1) and describe present marketing practices, facilities and agencies in the state, including pricing process at farm level; (2) effectiveness of marketing facilities in channeling forest products to uses most advantageous to forest landowner from standpoint of good forestry and financial returns; and (3) adequacy of available forest marketing statistics and services, both public and private.

For., Ag. Ec. 38. NEM-6.

Utilization

Colo. Investigations in Wood Utilization, Preservation, Seasoning, and Technology to Induce More Efficient Use of Colorado's Native Woods. To (1) determine utility and durability of local woods for fence posts, structural timbers, boxes and crates, etc., (2) determine inherent wood characteristics and problems associated with use of native woods which have not been adequately tested, (3) compare effectiveness of different preservatives and treatments designed to prolong service life of native woods used for farm, structural, and other purposes, and to develop new preservatives and treatments where existing ones are unsatisfactory, (4) develop economical seasoning practices for native woods to improve their use, (5) develop improved dimensional sawing techniques, (6) develop new products from and uses for native woods, including woody plants which are undesirable on range-lands and potential farmlands, and (7) develop new uses, such as mulch, bedding material, stock feed, alcohols, sugars, resins, etc., for by-products of wood utilization industry of value to ranchers, farmers, gardeners, and industrial concerns.

For. 70.

Ill. Analyzing the Penetration of Pentachlorophenol Wood-Preserving Solutions. To develop a satisfactory qualitative method to determine presence of pentachlorophenol in wood.

For. 55-331 N.

Ill. The Preservative Treatment of Wood Products for Farm and Home Use. -- A. The Preservative Treatment of Fence Posts (Northern Illinois). B. The Preservative Treatment of Electric Fence Stakes. C. The Preservative Treatment of Fence Posts (Southern Illinois). E. Horizontal vs. Vertical Treatment of Fence Posts. N. Analyzing the Penetration of Pentachlorophenol Wood Preserving Solutions. O. A Study of Pressure-Treated Millwork. Q. The Preservative Treatment of Greenhouse Duckboards.

For. 55-331.

Ill. The Effect of Low-Solution Temperatures, Wood-Moisture Content, and Intermittent and Continuous Types of Soaking on the Treatment of Ponderosa Pine. To determine what effect solution temperatures below 80° F., wood-moisture contents below fiber saturation point, and intermittent and continuous soaking periods have on the treatment of ponderosa pine with light-oil and heavy-oil solutions of pentachlorophenol.

For. 55-331 Sup. 1.

Ill.

Farm Construction as a Market for Native Timber. To learn (1) methods and channels currently used in marketing native timber for farm construction, (2) specifications and requirements for such timber, (3) extent to which native lumber can be used for farm construction in place of western and southern softwood lumber, (4) prejudices and objections to use of native lumber for farm construction, and how to remedy such, (5) possibilities of using recent technological developments as a means of developing new markets or improving existing ones for native lumber for farm construction.

For., Eng. 55-352. NCM-17.

Ind.

Improvement of Wood Utilization in the Structural Design of Buildings. (1) Design and test new structural elements of nail-glued, bolt-glued, and laminated construction for roof, floor, and wall systems. (2) compare wood structures fastened by various means subject to both static and repeated loads. (3) Extend development of nail-glued connection completed and study economic aspects of different means of fabrication.

For., Ag. Eng. 672.

Ind.

New Methods for Predicting the Strength of Structural Wooden Members. To (1) learn variability of structural wood elements of small size by introducing new methods of instrumentation and more rigorous methods of analysis; (2) examine behavior of full-size hardwood or softwood beams within present stress grades; and (3) devise non-destructive test system which includes variables other than those evaluated in a visual inspection system.

For. 746.

Ind.

Adaptation of Nail-Glued and Bolt-Glued Connections to Farm Buildings. (1) Apply known characteristics of nail-glued and bolt-glued structural elements to improvement of farm buildings by: a. investigating strength and behavior of full-size trusses with spans up to 60'. b. investigating problems in actual construction with such trusses, (2) test full-scale rigid frames for building designs, (3) investigate durability of glued structures in farm buildings, (4) learn economics of using nail- and bolt-glued connections in farm buildings, and (5) learn design procedures for nail- and bolt-glued trusses.

Ag. Eng. 806. NC-23.

Ind.

The Adaptability of Properly Cured Low-Grade Hardwoods for Structural Fabrications. (1) Evaluate performance of properly prepared problem species lumber with respect to workability using modern fasteners and devices for their application. (2) Test efficiency made with same using conventional loading systems with new systems made possible by new hydraulic test facilities under construction at Purdue. (3) Evaluate properly prepared lumber for component use in structural elements now under study on other Purdue projects.

For., Ag. Eng. 826.

La.

Preservative Treatment of Louisiana Timber Species for Use in Light Construction. To study (1) relationships between preservative treatments and durability of exterior finishes; (2) relationships between preservative treatments and dimensional stability of wood; (3) effects of preservative treatment on nail-holding ability; (4) effects of preservative treatment on service life of wood used in light construction.

For. 904.

Minn.

Increasing the Serviceability of Wood and Wood Products on Farms. (1) Reduce construction costs of farm structures made all or in part of wood thru use of more effective and economic construction methods and practices. (2) Reduce annual cost of wooden farm structures thru use of materials treated with wood preservatives. (3) Continue studying possibilities of tamarack as a source of treated posts.

For. 1912.

Miss.

The Utilization of Farm-Forest Products. To learn (1) effectiveness of various preservatives and methods of treatment in preservation of fence posts on farm; (2) most satisfactory methods of bark removal in terms of economy and of subsequent processing or use, paying particular reference to chemical debarking; (3) injurious effect on livestock from using treated lumber in building feed troughs and feed storage units.

For. FI-1.

Mo.

Marketing the Timber Crop. -- a. Preservation of Posts and Farm Timber. To secure factual data on simple methods of preservation employing methods available to the farmer; this year in particular to bring analysis of data up to date and to prepare a manuscript for publication, as well as to put in additional posts to service tests.

For. 120-a.

Mo. Utilization of Native Timber and Residues. To (1) survey wood-using industries in state to learn kind of wood technology problems; (2) study conditioning or treatment of wood by physical or chemical means to improve its value as raw material; (3) study improvement of techniques for fabricating products from wood; (4) develop uses for low-grade wood or wood residues; (5) study physical and structural properties of wood.

For. 159.

N. H. The Utilization of Products from Chemically Treated Trees. To determine (1) drying rate of wood in standing trees after chemical treatment; (2) effect on cost of product integration of chemically treated trees; and (3) methods for increasing value of wood products of chemically killed trees, and thereby bring into being a source of income.

For. 89.

N. J. A Study of Black Locust and its Suitability for Fence Posts as Influenced by Spacing, Pruning and Cultural Operations. To establish the proper management procedures for black locust, and investigate its growth and yield, and study performance on land unsuited for farming.

For. 302.

N. Y. The Utilization of Small Trees From the Farm Woodlot and Farm Plantation. To find new uses and more fully explore existing uses for the products which can be made from small trees, in order that the whole farm enterprise may be benefitted and the forest thinning operation conducted at a profit.

Cons. 67.

N. Y. Maple Products Production. (1) Learn costs of production of various aspects of syrup operations, as relative influence of sap flow over bucket and sugar percentage; how small an operation can be conducted profitably; study syrup quality as influenced by sugar sand, sap sweeteners, bacteria, and progress of season; analyze cost of early tapping, reaming, deep tapping, and hanging different number of buckets on tree. (2) Learn effect of crown on sap production and sugar concentration; what type of tree is most desirable and what to aim at in developing a sugar bush, and how best to thin sugar bush.

For., Ag. Ec. 98.

N. C. Utilization of Low Quality Wood Material. -- 1.
Problems of Hickory Utilization. To investigate and
develop methods and processes for increasing or im-
proving utilization of currently low value material.
In the forest this refers to (1) inferior, little-used
species, (2) deteriorated residual stands left after
logging operations, (3) material removed in timber
stand improvements, (4) timber on small tracts or
small volumes of high grade material too far from
mills, (5) timber isolated from markets for which
it is best suited, and (6) valuable species of inferior
quality growing on poor sites.
For. RM-M-7.

N. C. Factors Influencing the Drying of Veneer. To
investigate the effect upon drying rate of veneer of
the following factors; veneer species, heart and sap
condition, veneer thickness, initial moisture content,
drying temperature, time of exposure, and moisture
content of air during drying time.
For. M-10.

Okla. Survey to Determine the Economic Possibilities
for Charcoal Production in Oklahoma. To (1) determine
if there is a market for Oklahoma timber if it is con-
verted to charcoal form; (2) discover where charcoal
merchandized in Oklahoma comes from; (3) discover where
charcoal producers in Oklahoma and surrounding states
are selling their production; and (4) determine if an
increased Oklahoma charcoal production might profit-
ably supply markets in Oklahoma and surrounding areas.
For., Ag. Ec. 859.

Vt. Utilization, Processing, and Marketing of Small
and Inferior Tree Species in the Development of a
Management Program to Secure Maximum Stocking and In-
crement in Small Woodland Areas. Learn (1) species in
mixed stands in farm woodlands, adapted to sandy soil,
for making most rapid volume growth of high quality
wood, (2) best methods of improving above to provide a
maximum net annual income per acre by: increasing
quality, growth rate, and stocking, (3) home cost or
marketing forms for trees cut in improvement, (4) by
time-cost studies cost of various operations used in
objectives 2 and 3, (5) most practicable on-the-farm
methods of disease and insect control and damaged timber
salvage, and make time-cost studies of operations
required in development of final crop species.
For. 53.

REGIONAL PROJECTS

NCM-17 The Marketing of Farm Woodland Products in the North Central Region. The purpose of this project is to discover new or more profitable markets and uses for all the material now being produced in farm woodlands as a means of increasing farm income and encouraging better woodland management and utilization.

Cooperating stations: Federal-grant projects - Illinois, Michigan, Minnesota, and Missouri.

NCM-20 Marketing Christmas Trees and Greens in the North Central Region. 1. To determine the volume, by species and source, of Christmas trees and greens marketed in the North Central Region. 2. To determine outlets used by local growers, including prices received compared to prices received for trees imported into the region. 3. To determine reaction of dealers to locally grown plantation trees compared to imported trees. 4. To determine consumer preference as to size, species and other characteristics, and the regionality of such consumer preference. 5. To determine the approximate number of Christmas trees new growing. 6. To determine the present method of sales -- wholesale and retail -- including sources, transportation methods, contracts, markups, and surpluses. 7. To develop grades for trees marketed in the region.

Cooperating stations: Federal-grant projects - Ohio, Indiana, Minnesota.

NEM-6 Marketing Forest Products. 1. To determine and describe present marketing agencies, practices, and facilities in the region, including particularly a treatment of the pricing process at the farm level. 2. To determine the adequacy of marketing facilities from the standpoint of forest resources, and their effectiveness in channeling products to their most practicable use. 3. To determine the adequacy of available forest marketing statistics and services both public and private.

Cooperating stations: Federal-grant projects - Maine, Maryland, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Vermont, and West Virginia.

Marketing Practices and Prices for Western Non-Industrial Logs and Stumpage. 1. Describe the marketing system for western logs and stumpage with reference to: a. availability and location of markets, b. stability of markets and prices, c. type of buyers and transactions. 2. Analyze the pricing system of western log and stumpage markets as to: a. existing competition, b. variations in prices, c. factors affecting prices of logs and stumpage. 3. Evaluate the effectiveness of various marketing practices on income received by timber owners, and develop procedures for improving market and pricing systems.

Cooperating stations: Federal-grant projects - California, Colorado, Idaho, and Oregon.

S-36

Biology and Control of Certain Insects Affecting Forest Trees and Unfinished Forest Products in the South. (a) To evaluate damage caused by the insects previously listed. (b) To study life histories and habits of the insects listed. (c) To study the effect of environmental factors on the biology of the insects listed and the damage caused by them. (d) To develop for these species control measures that are applicable to nurseries, forests, woodlots, and unfinished wood products.

Cooperating stations: Federal-grant projects - Alabama, Mississippi.

S-23

The Application of Genetics and Cytology to the Improvement of Southern Pines. The objectives of this project are as follows: (a) to determine the range of genetic variabilities in species and races of southern pine and to evaluate the more promising genotypes. (b) To determine the heritability of the economically important morphological, physiological, and anatomical characters of southern pines. (c) To determine the genetical and cytological relationships between the species of southern pines. (d) To determine the mode of inheritance of the important economic characters of southern pines.

Cooperating stations: Federal-grant projects - Alabama, Georgia, Louisiana, North Carolina, Tennessee, and Texas.

NE-27

Forest Tree Improvement and Site Capability Determinations. (1) To determine in forest stands the commercial tree species to be favored in forest management on the basis of soil and site growth capabilities for high increment and quality forest products. (2) To consider seed production, sources of seed, and strains of important forest tree species as related to the development of superior stocks for forest plantings and Christmas tree production. (3) To investigate the frequency and occurrence of haploids in important coniferous species to establish homozygous lines by chromosome doubling for the utilization of homozygous haploids in the production of forest tree seedlings.

Cooperating stations: Federal-grant projects - Maine, Maryland, New Hampshire, New Jersey, New York (Cornell), Pennsylvania, and Vermont.

NE-25

Biology and Control of Wilt Pathogens. This project proposes a comprehensive study of the biology and control of wilt pathogens with major emphasis on oak wilt (Endocnidiophora fagacearum) and the Dutch elm disease (Ceratomyxa ulmi).

Cooperating stations: Federal-grant projects - Connecticut (New Haven), Massachusetts, New Jersey, New York (Cornell), Pennsylvania, Rhode Island, and West Virginia.

NC-22

Investigations on Oak Wilt. 1. To gain, on a region-wide basis, essential information concerning the fungus, Endocnidiophora fagacearum Bretz, causing the oak wilt disease; host range factors responsible for both local and long distance spread; to determine the vector or vectors. 2. To determine the importance of the fungus mat; its role in the spread of the fungus; and the conditions that affect its production. 3. To obtain information on the longevity of the fungus under as many conditions as possible and from this determine cultural practices that might influence control procedures; on the effect of the wilt fungus on wood from trees killed by the disease; and on a possible antibiotic relationship of associated wood fungi on the oak wilt organism. 4. To formulate control procedures from information obtained from the above objectives. The development of chemical control procedures by spraying chemotherapeutic treatment, & systemic treatment; woodlot practices by sanitation. 5. To ascertain the possibility of resistance within both the white oak and black oak group. 6. To develop, if possible, silvicultural practices that will allow continuous woodlot production even tho the disease is present. Studies on harvesting methods, woodlot care, & the general control measures that could be made to fit such practices.

Cooperating stations: Federal-grant projects - Illinois, Indiana, Iowa, Minnesota, Missouri, Ohio, Wisconsin, and Pennsylvania.

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FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL EXPERIMENT STATIONS

September, 1956

HOUSING

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CURRENT SERIAL RECORDS

Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington 25, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

HOUSING

SPACE REQUIREMENTS FOR HOUSEHOLD AND FAMILY ACTIVITIES AND STORAGE

- Ala. Body and Activity Measurements as a Basis for Designing Space, Facilities, and Equipment for the Home. To learn space required by homemakers around major items of household equipment and furnishings for activities related to their care and use.
Home Econ. 576. Cooperating States--Home Econ. Ill., Pa. and Wash. Coop. CHRB
- Ariz. Space Requirements For Activities and Storage for the Care of Infants and Young Children. To determine amount of space needed to care for infants and young children and to store materials and equipment used for this activity.
Home Econ. 323 (W-8)
- Ark. Space Requirements for Typical Activities Requiring Sitting, Using Unupholstered Straight Chairs Selected In Relation to Body Measurements of Adults. To determine (1) space needs for adults of various body types seated in unupholstered straight chairs while engaged in various activities in living rooms; (2) minimum and maximum comfortable distances between chairs when used concurrently by two or more adults; and (3) desired height of table surfaces for eating, writing and game playing when seated in chairs of chosen seat height.
Home Econ. 377 (S-8)
- Colo. The Improvement of Rural Housing in Colorado: A Study to Determine Functional Requirements. To (1) collect, analyze, and apply basic information on rural families and their environmental conditions that is required in developing house plans suited to various areas of western states; (2) establish basic planning data--space, equipment, and utilities--for dressing areas and related storage spaces in rural homes of West; and (3) develop and appraise house plans for selected sets of conditions that use to fullest extent the above information.
Home Econ. 206 (W-8)

Ga.

Requirements and Designs for Laundry Area for Southern Rural Homes. To (1) determine space needs for laundry activities in southern rural homes; (2) determine practical, economical and efficient arrangements of equipment and facilities for laundry areas; (3) study selected practices which may contribute to effective use of laundry areas; and (4) design and develop plans for minimum and desirable laundry areas in relation to other work areas in southern rural homes.

Home Econ. and Agr. Eng. 328 (S-8)

Ill.

Studies to Determine, Interpret and Present Farmhouse Requirements. To (1) determine requirements of farmhouses in terms of space, arrangement, environment, design of equipment, and functional features to provide satisfactory accommodations, (2) establish precise needs for space for household activities, storage, and arrangement of equipment and furnishings, and test effect of these phases of design on the worker in terms of time, motion, fatigue, and other measurable factors, and (3) interpret and apply results of field studies, case studies, lab research, and technological developments for developing plans and planning aids to new house construction and remodeling of old houses.

Home Econ. and Agr. Eng. 10-377 (NC-9)

Mont.

Personal Hygiene Areas in the Rural Home. To (1) determine factors affecting hygiene area needs in rural homes; (2) develop efficient arrangements for storage of equipment and supplies needed; (3) develop standardized sections of bathroom walls and storage areas to fit into bathrooms of various sizes and shapes to reduce building walls and storage areas to fit into bathrooms of various sizes and shapes to reduce building costs; and (4) prepare floor plans in number and variety needed in planning homes for western region.

Home Econ. 34 (W-8)

Nebr.

The Improvement of Existing Farm Dwellings in Terms of Basic Space Needs. To determine condition of existing farm dwellings in terms of space, room arrangement, window and door placement, utilities, and storage, so that basic remodeling plans may be recommended in terms of basic space needs for minimum health standards, most efficient use of space, best possible placement of doors and windows, best possible placement in existing dwellings of utilities and equipment such as running water, adequate wiring and heating, and best kind and place of storage facilities in existing farm dwellings

Home Econ. and Agr. Eng. 304A (NC-9)

N.Y.

(Cornell) Basic Space Requirements in Northeastern Farm Houses as Influenced by Activity Patterns. To establish adequate farm house planning guides for Northeastern region by (1) integrating research findings of space needs and facilities required for various activities carried on in the home; and (2) determining space needs of activities carried on simultaneously in same general area and in different areas of the home.

Housing and Design 113 (NE-20)

N.C.

Space and Storage Requirements for Home Activities of Children. To (1) determine activities of children of different ages in Southern rural families; (2) determine usual location in which these activities are performed and factors affecting acceptability and availability of the location; (3) develop activity centers satisfactory to selected families in amount of space and arrangement of equipment for child's playing, sleeping, eating, dressing, studying, etc.; and (4) design one or more bedrooms which meet the needs of a child or children at all ages from infancy through adolescence.

Home Econ. 76 (S-8)

Pa.

Basic Space Requirements in Pennsylvania Farm Houses as Influenced by Activity Patterns. To establish adequate farm house planning guides for Pennsylvania by (1) integrating research findings of space needs and facilities required for various activities carried on in the home and (2) determining optimum range of space needs for activities carried on simultaneously in same general area and in different areas of the home.

Home Mgt. and Housing 1112 (NE-20)

R. I.

Basic Space Requirements for Northeastern Farm Houses as Influenced by Household Activity Patterns. To investigate relationships of various activities in the home carried on simultaneously in the same general areas and in different areas of the house.
Home Econ. 454 (NE-20)

Tenn.

Relationships Between Specified Body Measurements and Space Used for Sitting, Rising, Reaching and Bending. To (1) investigate relations between certain body measurements and space used for sitting, rising, reaching, and bending; (2) improve selection of measurements to be taken in order to obtain more useful data for determining space requirements than are now available; and (3) refine the method of taking the selected measurements.

Home Econ. 111 (S-8)

Wash.

Housing Requirements of Rural Washington Families. To (1) develop techniques for determining space requirements for specific and combinations of activities in farm home workroom; (2) determine space requirements for such activities; and (3) design workrooms incorporating findings of the study.

Home Econ. 826 (W-8) Coop. Agr. Ext. Serv.

DESIGN AND CONSTRUCTION

Ala.

Simplification of Construction and Erection Practices for Exterior and Interior Walls in Farm Homes and Evaluation of Movable Free Standing Storage Units Designed to Meet Family Needs. To (1) establish designs and construction methods for prefabricated exterior and interior walls; (2) develop pre-cutting procedures for construction elements of rural homes with particular emphasis on simplicity of design and ease of construction; (3) test and evaluate construction materials and methods suitable for exterior and interior walls in rural homes; and (4) a. determine whether free standing storage units as designed provide maximum interchangeability, b. investigate specific requirements of size, shape, and dimensions that contribute to their proper functioning; c. establish by lab experimentation standards and designs for the construction of movable free standing storage units on basis of number and kinds of items owned by rural families as determined in Housing Survey S-8; and d. evaluate functional layout and esthetic appearance of storage units designed on the extent to which the following desirable features are considered--1. ease and economy of construction, 2. suitability for repetitive construction, and 3. acceptability by rural group for which intended.

Agr. Eng. and Home Econ. 532 (S-8)

Ala.

Attic Space Ventilation and Insulation. To (1) determine effects of gable roof attic space ventilation on ceiling panel temperatures; (2) compare adequate attic space ventilation methods with ceiling insulation methods for summer control of the ceiling panel temperatures under a gable roof; and (3) determine best method of ventilating a gable roof attic space for summer ceiling temperature control.

Agr. Eng. 558 (S-8)

Ala.

Design of Utility Structures for Alabama Farms. To design, construct, and test under farm conditions utility structures adapted to needs of Alabama farms.

Agr. Eng. 563

Ark.

Asphaltic Stabilization for Sub-Floors. To (1) determine suitability of asphaltic concrete as floor base for tile or wood; and (2) establish recommended design procedures for use of asphaltic concrete as floor base for tile or wood if material is found to possess desired characteristics for such use.

Agr. Eng. 369 (S-8)

Ga.

Design and Construction of Work and Storage Spaces for Farm Homes. To (1) establish construction designs for built-in and prefabricated equipment based on needs for more efficient use of space, to aid in smoother functioning of household activities and greater enjoyment in family living; (2) develop simple, economical construction designs for appropriate materials and methods to meet service needs for various facilities; (3) construct and evaluate operational characters of facilities as to serviceability, ease of maintenance, adequacy of space, and appropriateness of design; and (4) apply findings in improvement of construction methods and designs.

Agr. Eng. and Home Econ. 308 (S-8)

Idaho

Improvements in Utility, Cost, and Functional and Structural Design on Farm Buildings. To (1) improve functional design of farm buildings with respect to insulation, heating, ventilation and humidity control; (2) determine space requirements, and proper amount, concentration, and quality of light; (3) improve structural design of farm buildings without increasing cost including development of a mortar, or other methods of joining pumice block, improvement in present methods of joining structural members, development of increased strength of structural members and reduction in their size and weight, determination of limitations and most advantageous uses of prefabricated aluminum and magnesium materials, and investigations of possibilities for improvement in truss design and construction.

Agr. Eng. 234

III. Studies to Determine, Interpret and Present Farmhouse Requirements. To (1) determine requirements of farmhouses in terms of space, arrangement, environment, design of equipment, and functional features to provide satisfactory accommodations, (2) establish precise needs for space for household activities, storage, and arrangement of equipment and furnishings, and test effect of these phases of design on the worker in terms of time, motion, fatigue, and other measurable factors, and (3) interpret and apply results of field studies, case studies, lab research, and technological developments for developing plans and planning aids to new house construction and remodeling of old houses.

Home Econ. and Agr. Eng. 10-377 (NC-9)

Ind. Thermal and Moisture Properties of Floors in Farm Buildings. To (1) determine what types of floors are most suitable for farm buildings used for the storage of farm products and housing of livestock; (2) study heat and moisture transfer through floors taking into consideration such factors as the type of fill, soil conditions, flooring material and foundation.

Agr. Eng. 390

Ind. Improvement of Wood Utilization in the Structural Design of Buildings. To (1) design and test new structural elements of nail-glued, bolt-glued, and laminated construction for roof, floor, and wall systems; (2) compare wood structures fastened by various means subject to both static and repeated loads; (3) extend development of nail-glued connection completed and study economic aspects of different means of fabrication.

Agr. Eng. 672

Ind. Adaptation of Nail-Glued and Bolt-Glued Connections to Farm Buildings. To (1) apply known characteristics of nail-glued and bolt-glued structural elements to improvement of farm buildings by: a. investigating strength and behavior of full-size trusses with spans up to 60', b. investigating problems in actual construction with such trusses; (2) test full scale rigid frames for building designs; (3) investigate durability of glued structures in farm buildings; (4) learn economics of using nail- and bolt-glued connections in farm buildings; and (5) learn design procedures for nail- and bolt-glued trusses.

Agr. Eng., For. Conserv. and Agr. Econ. 806 (NC-23)

Iowa

The Selection and Utilization of Building Materials. To (1) determine design conditions for relatively low pitched gable roofs for farm buildings; (2) determine optimum spacing of roof trusses, considering efficiency in use of materials and labor consumed in construction; (3) investigate various types of trussed roof framing, their relation to stresses in members, ease of fabrication, and assurance of satisfactory results; (4) investigate relative practicability and economy of using nails, bolts, connectors and glue in roof trusses; (5) determine magnitude of secondary stresses resulting from use of rigid glued joints and relation to design; and (6) design standard trusses to be included in Midwest Plan Service.

Agr. Eng. 1036 (NC-23)

Mich.

Farmhouse Safety. To (1) determine the nature and cause of a representative sample of accidental stairway falls; (2) the physical factors of stairways that contribute to making them hazardous; (3) the energy requirements of walking up and down different types of stairways; (4) evaluate stairways in the laboratory from the standpoint of design and the way people habitually walk up and down them; and (5) formulate design specifications for safe stairways for home.

Agr. Eng. 454 (NC-9)

Mich.

Control of High Moisture Conditions in Houses. To (1) investigate high moisture conditions in houses and determine more specifically the problems, related factors, and minimum-maximum allowable ranges for relative humidities during various seasons; (2) determine economical and practical ways of reducing the moisture content of the interior air during various seasons; (3) develop, where certain moisture levels are desired, a wall system and construction technique for wall units that will eliminate exterior paint failures and condensation in the wall; and (4) study the effect of recirculating heating systems on moisture control and determine the value and justification of mixing a portion of outside fresh air into forced warm air heating systems.

Agr. Eng. 454-2 (NC-9)

Mich.

Materials and Fasteners Used in Fabricating Wood Trusses. To investigate (1) materials available for use in gusset plates for trusses with glue as a binder; (2) procedures and equipment for measuring strain in wood; and (3) use of models in analyzing strain in trusses.

Agr. Eng. and Dairy 455 (NC-23)

Miss.

A Study of Different Masonry Building Materials and Methods of Erection for Outside Wall Construction and Their Effects on the Inside Temperature and Heat Loss in Farm Homes. To (1) compare temperature or comfort inside houses made of different types masonry outside walls, using house with wood frame construction for comparison; (2) compare heat loss through different masonry walls and compare them with wood frame house; (3) study how heat absorbed in masonry walls during daytime will affect comfort inside the building during night in hot season; (4) test different masonry units, combinations of units, or different methods of erection for an economical, durable and long-life construction; and (5) test to see if masonry walls on sunny side of house during winter will absorb heat from sun rays and help warm the building.

Agr. Eng. RRFB-1 (S-8)

Oreg.

The Development of the OSC 141 Farm-Building Construction Incorporating Interchangeable Wood Parts With Which Buildings Can Be Easily Assembled, Altered, or Disassembled. To develop and evaluate for feasibility OSC 141 Farm-Building Construction.

Agr. Eng. 273-1

S. Dak.

Application of New Materials and Design in Farm Buildings. To (1) obtain service and design information on farm building materials on such buildings in use at South Dakota State College and its Field Stations and on successful farms, especially the following phases of construction materials---(a) dairy barn floors - concrete, (b) roofs - composition, wood, metal, and bituminous, (c) foundations - concrete and concrete block, (d) feeding floors - concrete, (e) walls - wood and concrete block, (f) granary - wood and steel (portable), (g) silo construction - concrete and tile, (h) hog houses - wood (portable), (i) wood framing fasteners - metal, (j) end grooved siding - wood, (k) light weight rafters on long spans - wood and metal, and (l) clay product walls - brick and tile; (2) utilize data secured toward better structural development, more satisfactory utilization, and increased serviceability of farm buildings and homes; and (3) assemble and evaluate surveyed data of existing and future structures and incorporate the results in form of farm building and farm home design.

Agr. Eng. 203

Va.

Structural Stability of Farm Buildings Under Accelerated Cycles of Loading. To (1) learn the structural stability of full scale building sections, joints and other components under accelerated cycles of loading; and (2) develop criteria for balanced designs.

Agr. Eng. 86076

Wash.

Farmstead and Farm Building Design and Arrangement for Dairy Farms in the Irrigated Section of Washington. To coordinate existing knowledge of dairy farm buildings design and arrangement and to synthesize new designs and integration of the farm home, barns, milk house, and other buildings into effective farmstead plans for living and dairy production and different stages of development for new, irrigated dairy farms.

Agr. Eng. 964. Coop. Ext. Serv. and Col.
of Arch.

MATERIALS

- Alaska Use of Alaskan Building Materials in Farm and Home Construction. To develop methods of constructing, insulating, and vapor sealing food storages, farm homes and other agricultural structures using native Alaskan materials and labor.
Agr. Eng. 28
- Ala. Improving the Marketability of Southern Wood.
To increase margin available to manufacturer of wood products by increasing use and value of products to consumer by: evaluating properties giving most to quality and value; developing new sizes, shapes or forms for better use and marketability; making wood properties better competitor with other materials; improving fabrication for more efficient engineering designs.
For. 564
- Ark. Farm Home Improvement Through Practices and Methods for Obtaining Adequate Farm Housing at Low Cost.
To (1) determine functional requirements of farm homes to meet needs and activities of the farm family, such as space, arrangement, health needs, equipment, and facilities; (2) study requirements for remodeling and improving farm homes; (3) determine methods of using native materials and low cost commercial materials, separately and in combination, to secure adequate, attractive, and economical rural housing; (4) prepare and make available to farm families home plans using best combinations as shown by results of projects.
Agr. Eng. 282
- Ark. Asphaltic Stabilization for Sub-Floors. To (1) determine suitability of asphaltic concrete as floor base for tile or wood; and (2) establish recommended design procedures for use of asphaltic concrete as floor base for tile or wood if material is found to possess desired characteristics for such use.
Agr. Eng. 369 (S-8)

Colo.

Investigations in Wood Utilization, Preservation, Seasoning, and Technology to Induce More Efficient Use of Colorado's Native Woods. To (1) determine utility and durability of local woods for fence posts, structural timbers, boxes and crates, etc.; (2) determine inherent wood characteristics and problems associated with use of native woods which have not been adequately tested; (3) compare effectiveness of different preservatives and treatments designed to prolong service life of native woods used for farm, structural, and other purposes, and to develop new preservatives and treatments where existing ones are unsatisfactory; (4) develop economical seasoning practices for native woods to improve their use, (5) develop improved dimensional sawing techniques.

For. 70

Ill.

The Effect of Low-Solution Temperatures, Wood-Moisture Content, and Intermittent and Continuous Types of Soaking on the Treatment of Ponderosa Pine.

Ill.

To determine what effect solution temperatures below 80° F., wood-moisture contents below fiber saturation point, and intermittent and continuous soaking periods have on the treatment of ponderosa pine with light-oil and heavy-oil solutions of pentachlorophenol.

For. 55-331

Ill.

Farm Construction as a Market for Native Timber. To (1) learn (1) methods and channels currently used in marketing native timber for farm construction; (2) specifications and requirements for such timber; (3) extent to which native lumber can be used for farm construction in place of western and southern softwood lumber; (4) prejudices and objections to use of native lumber for farm construction, and how to remedy such; (5) possibilities of using recent technological developments as a means of developing new markets or improving existing ones for native lumber for farm construction.

Agr. Eng. and For. 55-352 (NCM-17)

Ind. New Methods for Predicting the Strength of Structural Wooden Members. To (1) learn variability of structural wood elements of small size by introducing new methods of instrumentation and more rigorous methods of analysis; (2) examine behavior of full-size hardwood or softwood beams within present stress grades; and (3) devise non-destructive test system which includes variables other than those evaluated in a visual inspection system.
For. Conserv. 746

Ind. The Adaptability of Properly Cured Low-Grade Hardwoods for Structural Fabrication. To (1) evaluate performance of properly prepared problem species lumber with respect to workability using modern fasteners and devices for their application; (2) test efficiency made with same using conventional loading systems with new systems made possible by new hydraulic test facilities under construction at Purdue; (3) evaluate properly prepared lumber for component use in structural elements now under study on other Purdue projects.
Agr. Eng. and For. Conserv. 826

Iowa The Selection and Utilization of Building Materials. To (1) determine design conditions for relatively low pitched gable roofs for farm buildings; (2) determine optimum spacing of roof trusses, considering efficiency in use of materials and labor consumed in construction; (3) investigate various types of trussed roof framing, their relation to stresses in members, ease of fabrication and assurance of satisfactory results; (4) investigate relative practicability and economy of using nails, bolts, connectors and glue in roof trusses; (5) determine magnitude of secondary stresses resulting from use of rigid glued joints and relation to design; and (6) design standard trusses to be included in Midwest Plan Service.
Agr. Eng. 1036 (NC-23)

La. Building Materials From Farm Residues. To develop (1) new building materials from farm waste, (2) materials as resistant as possible to rot, termites, rodents, and weather; and (3) a light weight panel for construction of farm homes and storage structures.
Agr. Eng. 555

- La. Preservative Treatment of Louisiana Timber Species for Use in Light Construction. To study (1) relationships between preservative treatments and durability of exterior finishes; (2) relationships between preservative treatments and dimensional stability of wood; (3) effects of preservative treatment on nail-holding ability; (4) effects of preservative treatment on service life of wood used in light construction.
For. 904
- Mich. Materials and Fasteners Used in Fabricating Wood Trusses. To investigate (1) materials available for use in gusset plates for trusses with glue as a binder; (2) procedures and equipment for measuring strain in wood; and (3) use of models in analyzing strain in trusses.
Agr. Eng. and Dairy 455 (NC-23)
- Minn. Increasing the Serviceability of Wood and Wood Products on Farms. To (1) reduce construction costs of farm structures made all or in part of wood through use of more effective and economic construction methods and practices; (2) reduce annual cost of wooden farm structures through use of materials treated with wood preservatives; (3) continue studying possibilities of tamarack as a source of treated posts.
For. 1912
- Minn. Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage.--III. Lumber and Other Wood Products. To determine prevalence and cause of discoloration of aspen wood, and to devise methods of prevention and control.
Pl. Path. and Bot. 2220-3

Miss.

A Study of Different Masonry Building Materials and Methods of Erection for Outside Wall Construction and Their Effects on the Inside Temperature and Heat Loss in Farm Homes. To (1) compare temperature or comfort inside houses made of different types masonry outside walls, using house with wood frame construction for comparison; (2) compare heat loss through different masonry walls and compare them with wood frame houses; (3) study how heat absorbed in masonry walls during daytime will affect comfort inside the building during night in hot season; (4) test different masonry units, combinations of units, or different methods of erection for an economical, durable and long-life construction; and (5) test to see if masonry walls on sunny side of house during winter will absorb heat from sun rays and help warm the building.

Agr. Eng. RRFB-1 (S-8)

Mo.

Utilization of Native Timber and Residues.

To (1) survey wood-using industries in state to learn kind of wood technology problems; (2) study conditioning or treatment of wood by physical or chemical means to improve its value as raw material; (3) study improvement of techniques for fabricating products from wood; (4) develop uses for low-grade wood or wood residues; (5) study physical and structural properties of wood.

For. 159

Mo.

Marketing and Processing of Hardwood Panelling.

To determine (1) consumer preference for different grades, sizes, and finishes of panels; (2) effects of different finishing materials and methods of applying these materials on appearance of panels; (3) effectiveness of different types of fasteners for holding panels in place; (4) best methods of manufacturing panelling; and (5) cost of producing panelling.

For. 259 (NCM-17)

Ohio

The Determination of Suitable Work Surface Materials and Finishes Used in Rural Homes from the Standpoint of Maintenance, Durability, and Cost. To (1) determine suitability of available materials and finishes for work counter surfaces which will give durability, satisfaction, and can be cared for easily; (2) ascertain comparative costs of these materials and finishes--initial, maintenance, and length of service; (3) ascertain relative costs of installation of these surfaces; and (4) ascertain availability of materials on the market.

Home Econ., Agr. Chem., Agr. Eng. and
Arch. 80-2 (NC-9)

P.R.

Chemical Characterization of the Termite-Repellant Substance in West Indian Mahogany Wood (Swietenia mahogany). To characterize chemically the substance responsible for termite-repellent activity of mahogany wood.

School of Med. 83

S. Dak.

Application of New Materials and Design in Farm Buildings. To (1) obtain service and design information on farm building materials on such buildings in use at South Dakota State College and its Field Stations and on successful farms, especially the following phases of construction materials--(a) dairy barn floors - concrete, (b) roofs - composition, wood, metal, and bituminous, (c) foundations - concrete and concrete blocks, (d) feeding floors - concrete, (e) walls - wood and concrete block, (f) granary - wood and steel (portable), (g) silo construction - concrete and tile, (h) hog houses - wood (portable), (i) wood framing fasteners - metal (j) end grooved siding - wood, (k) light weight rafters on long spans - wood and metal, and (l) clay product walls - brick and tile; (2) utilize data secured toward better structural development, more satisfactory utilization, and increased serviceability of farm buildings and homes; and (3) assemble and evaluate surveyed data of existing and future structures and incorporate the results in form of farm building and farm home design.

Agr. Eng. 203

Tenn.

New Type Concrete Block for Building a Farm House. To (1) develop and test methods of construction using concrete units that have been developed and tested individually; (2) determine practical value of local expanded shale aggregate for construction of all-concrete farm houses; (3) find out if house can be constructed by unskilled or semi-skilled labor; (4) determine cost of type of construction; and (5) have an all-concrete house in which factors that affect comfortable living can be studied.

Agr. Eng. 30 (S-8)

Tex.

Desirability of Materials and Methods of Installation for Floor Coverings, Drainboard Surfaces, Floor and Wall Finishes, and Wall Coverings. To (1) determine by lab tests and actual installation in farm homes the useful life of covering, surfacing and finishing materials for use in farm home construction; (2) determine proper application for covering, surfacing and finishing materials used in the homes to include bindings, fastenings, and adhesives; (3) determine relative desirability of various materials for specific applications; and (4) correlate useful life and cost with desirability of various covering, surfacing and finishing materials for various types of uses.

Agr. Eng. and Home Econ. 943 (S-8)

UTILITIES

Mass.

Comparative Statistical Study of Certain Methods for Bacteriological Testing of Water. To make statistically controlled study for comparison of the "Standard Methods" Most Probable Number procedure for estimating the coliform density of water with enumeration by the Millipore Filter technique and by Violet Red Bile and Desoxycholate Agars.
Bact. 16

Mich.

Control of High Moisture Conditions in Houses. To (1) investigate high moisture conditions in houses and determine more specifically the problems, related factors, and minimum-maximum allowable ranges for relative humidities during various seasons; (2) determine economical and practical ways of reducing the moisture content of the interior air during various seasons; (3) develop, where certain moisture levels are desired, a wall system and construction technique for wall units that will eliminate exterior paint failures and condensation in the wall; and (4) study the effect of recirculating heating systems on moisture control and determine the value and justification of mixing a portion of outside fresh air into forced warm air heating systems.
Agr. Eng. 454-2* (NC-9)

Mo.

Farm Water Supply. To (1) design and test effectiveness of at least two different experimental vertical slow-sand filters under different pond water conditions; and (2) develop a practical technique for filtering pond water and set forth specifications for such a filtering system, which can consistently be expected to supply water suitable for domestic purposes in farm homes.
Agr. Eng. 155 (NC-9)

N.J.

Rural and Urban Aspects of Water Pollution. To study various types of pollution of surface and underground waters as they affect public health and environmental sanitation.
Sanitation 586

N. Dak. An Electrical Househeating System vs.
a Hot Air System Fired with Oil, Bottle Gas, or
Natural Gas. To secure (1) operating and maintenance
cost information on an electrical heating system
as compared to hot air system fired with oil,
bottle gas, or natural gas; (2) information on
temperature variation, dust accumulation, and
humidity on the two systems.

Agr. Eng. 4-4 (NC-9)

S. Dak. Farm and Home Water Quality Improvement.
To (1) investigate ways to reduce salt content of farm
water supplies and adapt them to farm water systems;
(2) learn ways for home laundering in excessively hard
waters which will give suitable whiteness retention and
fabric strength retention; (3) learn effects of various
types of high salt waters on flavor, texture, and
nutritional value of foods, and study remedial measures.

and Agr. Eng., Home Econ., Biochem. 275

PHYSICAL ENVIRONMENT

- Ala. Attic Space Ventilation and Insulation.
To (1) determine effects of gable roof attic space ventilation on ceiling panel temperatures; (2) compare adequate attic space ventilation methods with ceiling insulation methods for summer control of the ceiling panel temperatures under a gable roof; and (3) determine best method of ventilating a gable roof attic space for summer ceiling temperature control.
Agr. Eng. 558 (S-8)
- Ala. Thermal and Associated Conditions Related to the Operation and Use of Household Appliances. To (1) develop methods of measuring quantitatively thermal and related conditions caused by operation and use of household appliances during the summer; (2) use methods developed to investigate such effects of operation and use of appliances which may influence human comfort in summer; and (3) investigate readily obtainable means of reducing thermal and related discomforts caused by operation and use of household appliances.
Home Econ. 559
- Alaska Use of Alaskan Building Materials in Farm and Home Construction. To develop methods of constructing, insulating, and vapor sealing food storages, farm homes and other agricultural structures using native Alaskan materials and labor.
Agr. Eng. 28.
- Ark. Farm Home Improvement Through Practices and Methods for Obtaining Adequate Farm Housing at Low Cost. To (1) determine functional requirements of farm homes to meet needs and activities of the farm family, such as space, arrangement, health needs, equipment, and facilities; (2) study requirements for remodeling and improving farm homes; (3) determine methods of using native materials and low cost commercial materials, separately and in combination, to secure adequate, attractive, and economical rural housing; and (4) prepare and make available to farm families home plans using best combinations as shown by results of projects.
Agr. Eng. 282

- Calif. Environmental Influences on Orientation and House Design, Including the Use of Plant Materials and Home Furnishings to Improve Living Comfort.. To determine how environmental conditions can be modified to improve living comfort of rural housing in the Western Region.
Home Econ. 1536 (W-8)
- Colo. The Improvement of Rural Housing in Colorado: A Study to Determine Functional Requirements. To (1) collect, analyze, and apply basic information on rural families and their environmental conditions that is required in developing house plans suited to various areas of western states; (2) establish basic planning data--space, equipment, and utilities--for dressing areas and related storage spaces in rural homes of West; and (3) develop and appraise house plans for selected sets of conditions that use to fullest extent the above information.
Home Econ. 206 (W-8)
- Ill. Illinois Weekly Precipitation Probability Project. To produce weekly summary IBM cards for 10 weather stations in state so probability studies of meteorological parameters on regional basis can be accomplished.
Hort. 65-316 (NC-26). Coop. USWB (USDC)
- Ind. The Analysis and Interpretation of Indiana Weather Records. To (1) record on IBM cards data from each location in state for which records cover 10 or more years; (2) make certain statistical analyses of data by years, seasons, months, weeks and days; (3) keep past, present, and future climatic data current and available for use.
Agron. 830 (NC-26) Coop. USWB (USDC)
- Iowa Recording and Processing Meteorological and Phenological Data for Use in Agriculture. To (1) put additional Iowa weather on punched cards; (2) analyze and interpret Iowa weather data; and (3) coordinate Iowa weather data and reports with similar information in the North Central states.
Agron. 1280 (NC-26). Coop. USWB (USDC)

Kans.

Weather in Relation to Kansas Agriculture.

To (1) put Kansas weather data on punch cards; (2) analyze, interpret, and report weather data; (3) coordinate weather data and reports with similar information of other North Central states; (4) study relation of weather to methods of crop production, livestock management, and agricultural marketing.

Agron. 437 (NC-26). Coop. USWB (USDC)

Mich.

Control of High Moisture Conditions in

Houses. To (1) investigate high moisture conditions in houses and determine more specifically the problems, related factors, and minimum-maximum allowable ranges for relative humidities during various seasons; (2) determine economical and practical ways of reducing the moisture content of the interior air during various seasons; (3) develop, where certain moisture levels are desired, a wall system and construction technique for wall units that will eliminate exterior paint failures and condensation in the wall; and (4) study the effect of recirculating heating systems on moisture control and determine the value and justification of mixing a portion of outside fresh air into forced warm air heating systems.

Agr. Eng. 454-2 (NC-9)

Mich.

Analysis and Interpretation of Climatological Information. To (1) facilitate analysis of climatological information for agricultural purposes; (2) prepare summaries of weather conditions at selected locations as Detroit, Bay City, and Kalamazoo.

Agr. Eng. and Pl. Physiol. 834 (NC-26)

Coop. USWB (USDC)

Minn.

Studies on the Improvement of Minnesota

Forest and Shade Trees. To (1) improve naturally regenerated stands through establishment of guides to the recognition of superior parents for seed production; (2) develop means of producing cheaper and more abundant sources of seed of superior strains; (3) develop information on seed sources and/or produce hybrids giving promise of providing superior planted stands that may grow more rapidly, have better form for windbreaks; and show resistance to insects or diseases; and (4) test introduced species and hybrids.

For. 1913

Miss.

A Study of Different Masonry Building Materials and Methods of Erection for Outside Wall Construction and Their Effects on the Inside Temperature and Heat Loss in Farm Homes. To (1) compare temperature or comfort inside houses made of different types masonry outside walls, using house with wood frame construction for comparison; (2) compare heat loss through different masonry walls and compare them with wood frame house; (3) study how heat absorbed in masonry walls during daytime will affect comfort inside the building during night in hot season; (4) test different masonry units, combinations of units, or different methods of erection for an economical, durable and long-life construction; and (5) test to see if masonry walls on sunny side of house during winter will absorb heat from sun rays and help warm the building.

Agr. Eng. RRFB-1 (S-8)

Mo.

Investigations of the Effects of Meteorological and Climatological Variation on Agricultural Production in Missouri. To (1) define Missouri's climatic characteristics; (2) study transfer of energy and water vapor between atmosphere and plant and soil surfaces, obtaining information on temperature of soil, temperatures within and above plant covers, and water losses by transpiration; and (3) aid the Departments of the Division of Agricultural Sciences in the definition of weather factor affecting agricultural production.

Soils, Field Crops, Hort. 210. Coop.

USWB (USDC)

Mo.

Effects of Climatological Variations on Agricultural Production in Missouri. To (1) continue assembling Missouri's climatological records; process data, and punch weather records on IBM cards, thus assisting in fulfillment of major objective of Regional Project NC-26; (2) prepare analyses of climatological data important to agricultural production as: determination of probability of precipitation amounts for climatological stations in state; (3) establish adequate weather instrumental installations at experiment stations so as to provide information to be used in research dealing with effects of weather on agricultural production.

Soils 281 (NC-26). Coop. USWB (USDC)

- Neb. Planing Nebraska Climatological Data on IBM Cards, and Preparation of Rainfall Summaries.
To (1) place weather data, which has been collected for last 30-50 years at state weather stations, on IBM punch cards accessible to any experiment station worker; (2) prepare necessary summaries of rainfall observations for participation in regional rainfall probability studies being initiated under direction of NC-26 Technical Committee.
Anim. Husb. 510 (NC-26). Coop. USWB (USDC)
- N.H. Agricultural Climatology of New England.
To derive a quantitative and complete description of climate of New England within limitations of available data.
Agr. Eng. 107 (NE-35). Coop USWB (USDC)
- N.J. Microclimatology and Its Relation to Agriculture. To (1) translate Geiger's "The Climate of the Layer of Air Near the Ground"; (2) select material from the above which is of interest to American farmers, forestry, etc.; (3) supplement this material with incorporation of very scattered American and foreign literature, with extensive chapters on forestry, front protections, etc., and (4) prepare an extensive international bibliography.
Met. 377.
- N.Y. A Study of the Relationships Between Topo-
(Cornell) graphy, Climate and Microclimate, and Crop Growth and Yield. To determine (1) what variations in weather, climate, and microclimate may be significant in producing special and temporal variations in plant growth and crop yield; (2) at what stages in growth of a plant meteorological variations may be most significant in their effect on final yield; and (3) relationships between microclimate and topography so that variations in microclimatic conditions may be estimated within areas where instruments are not situated.
Agron. 53

N. Dak.

Weather Information for Agriculture in North Dakota. To (1) make weather data and climatic summaries more readily available to North Dakota agricultural workers; (2) record and summarize North Dakota weather data in a manner in which it can be coordinated with a similar data for the region; and (3) determine what additional weather data, not now available but of value in agricultural research, should be taken and to encourage initiation of observations to obtain such data.

Met. 1-1 (NC-26). Coop. USWB (USDC)

S. Dak.

Weather Information for Agriculture. To (1) analyze and interpret weather and climatic information as to its application to agriculture, especially to farm management decisions; (2) prepare state summaries and assist in preparation of regional ones of weather and climate related to agriculture; (3) aid in coordinating and standardizing studies made by cooperating agencies on weather influence in area on farms.

Agr. Econ. 291 (NC-26)

Wis.

Probability of Wet or Dry Weather in Wisconsin. To summarize occurrences of excessive and insufficient precipitation periods for 10 Wisconsin cities as a function of probability of occurrence of rainfall amount at given time; probable length of wet and dry spells; critical amounts determined by soil types, vegetation, and estimates of evaporative water loss.

Soils 947b (NC-26)

PHYSIOLOGICAL RESPONSES TO HOUSEHOLD ACTIVITIES AND ENVIRONMENT

Ill. The Comfort of Clothing of Varying Fiber Content.

To (1) determine relative comfort of nylon and cotton clothing for subjects under different conditions of temperature and humidity, and (2) find if a humidity of 60% at 76° F. is acceptable air conditioning for personal comfort.

Home Econ. and Agr. Eng. 60-382

Mich. The Energy Expenditures of Older Women.

To (1) investigate energy requirements of aging women; (2) measure energy expenditure of older women when at rest, sitting, standing or performing simple household tasks; and (3) conduct pilot study of energy requirements of older women with development of series of controlled work patterns and techniques of study of energy expenditures which may be used by cooperating laboratories in similar research.

Home Econ. 79 (NC-5)

Ohio Physiological Responses of Women at Work in the Home: Relationship to Methods of Work and to Design of Work Areas and Labor-Saving Appliances. To (1) determine energy requirements of women in performance of household tasks; (2) ascertain methods of work needing a minimum of effort and time; (3) determine relationship between energy requirements for women and space arrangements of work areas in home; (4) use energy needs as one of bases in planning activity space areas by architects and home planners; (5) determine relationships of energy needs to design of various labor saving appliances in home; and (6) translate findings for use of appliance designers as means for improved designs.

Home Econ. 80-3 (NC-9)

SOCIAL AND ECONOMIC FACTORS

Iowa

Economic and Social Factors Related to Characteristics of Farm Dwellings in the North Central Region. To determine degree and nature of relationships between each of several socio-economic factors and :a. each of several physical characteristics of farm dwellings; b. composite of several physical characteristics of farm dwellings; and c. changes between 1940-1950 in prevalence of selected physical characteristics of farm dwellings, each for the region as a whole and for areas relatively homogenous in point being studied.

Home Econ., Agr. Econ. and Soc. and
Statis. 933 (NC-9)

Kans.

Farm Family Living Patterns, Activities and Preferences Used as a Basis for Functional Designing of Farm Houses.--Housing Requirements of Kansas Farm Families with Children. To (1) secure information on patterns of family living as shown by activities of family members; (2) study variation in family activities and requirements as affected by stage in family life cycle, and to a certain extent by type of farming and income; (3) determine family preferences for location of activities; (4) determine equipment and materials necessary to perform the activities; and (5) study space needed for performing the activities, and storing the equipment used.

Home Econ. 288 (NC-9)

N.Y.

(Cornell) Improved Housing Design Based on Family Living Characteristics. To (1) determine specific patterns of family living, including habits and motives underlying different family activities as they are related to housing design in contrast to housing "preferences", and (2) make information available in a form of maximum utility to rural and urban families, builders, planners, and others.

Housing and Design 112

- N. Y. Adjustment in Rural Housing Inventory in a
(Cornell) Selected Area of New York State Due to Consolidation
of Farms. To (1) explore adjustment taking place in
rural housing inventory due to consolidation of farms,
and (2) analyze its economic implication.
Housing and Design, and Agr. Econ. 114
- Tenn. Income and Expenditure Patterns of Tennessee
Farm Families. To learn (1) influence of income level on
farm family spending patterns, (2) relationship between
income and home production practices; and income and
characteristics of farm, the family and family dwellings.
Home Econ. and Rur. Sociol. 89
- Vt. Possibilities for Improving Vermont Farm
Houses. To investigate possibilities for altering houses
occupied by owner-operators of Vermont dairy farms so as
to make them suitable to the needs of present-day families.
Possibilities will be according to: ability of farm to pay
for adequate house, present value of farm and probable
future income; present conditions of the house; altera-
tions needed to make house satisfactory; and cost of
needed alterations.
Home Econ. and Agr. Econ. 55
- Vt. The Economic Status of Vermont's Aged Farmers
and Their Wives or Widows. To determine in what conditions
Vermont farmers and their wives or widows are living--
with regard to amount and source of income, employment,
place of residence, domicile status and comfort and
convenience of housing.
Home Econ. 63
- Wisc. Effect of Income, Tenancy, Family Composition
and Other Factors on Farm Home Requirements.--a. Housing
the Aged Rural Population in the North Central Region.
To (1) find housing needs peculiar to rural aged persons;
(2) discover characteristics and living patterns of rural
aged of probable significance in determining housing needs,
including retirement patterns, income sources and
family arrangements about income, use of time as related
to housing needs, and problems of housing the aged; (3)
determine relation between characteristics and living
patterns of rural aged and such factors as income level,
degree of urbanization; etc.; and (4) suggest specific
standards for housing rural farm older population and
methods by which these standards may be met by dwelling
units.
Home Econ. 408-a (NC-9)

REGIONAL PROJECTS

NC-9

Farmhouse Requirements and Their Application in the Improvement of Farm Housing. To (1) establish farmhouse requirements of space, arrangement, utilities, equipment, surface materials and finishes, and other facilities needed by farm families, for safety, health, comfort, convenience, and economy; (2) study the influence of selected geographical, economic, and social factors upon housing needs of farm families as a basis for adapting house plans and remodeling procedures to serve the interests of various groups; and (3) develop basic plans for new farmhouses and determine fundamental procedures for farmhouse remodeling that have qualities of adaptability and flexibility to meet various needs. Participating States--Federal-grant projects--Ill., Iowa, Kans., Mich., Minn., Mo., Nebr., N. Dak., Ohio, Wis. Cooperating States--Ind., S. Dak. Coop. CHRB.

NE-20

Basic Space Requirements for Northeastern Farm Houses as Influenced by Household Activity Patterns. To establish adequate farm house planning guides for the Northeastern region (1) by integrating research findings of space needs and facilities required for various activities carried on in the farm home, and (2) by determining the effect on space needs and facilities of performing several of the individual activities in the same general area. Participating States--Federal-grant projects--N.J., N.Y.(Cornell), Pa., R.I. Cooperating States--Maine, N.H., Storrs (Conn.), Vt. Coop. CHRB.

S-8

Functional Requirements and Plans for Southern Rural Homes. To (1) develop minimum and desirable recommendations for family activity centers, efficient arrangements of equipment and activity centers, functional requirements and designs for household facilities and equipment, and test the multiple use of rooms and areas and determine the need for, and means of accomplishing flexibility in space arrangements and sizes; (2) determine more efficient utilization of native and other materials and develop appropriate structural methods for low-cost maintenance and construction of new farm homes and remodeling of existing farm homes; and (3) develop new designs and a series of remodeling designs to conform to the requirements and findings established in (1) and (2) and previous studies. Participating States--Federal-grant projects--Ala., Ark., Ga., Miss., N.C., Tenn., Tex. Coop. CHRB.

W-8

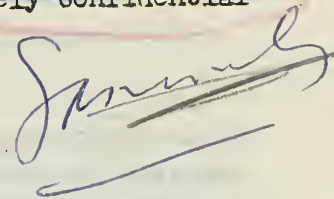
Improvement of Rural Housing in the Western Region. To (1) determine the dimensions of space need to (a) carry on household activities, (b) store family possessions conveniently, and (c) arrange equipment efficiently, for each of the various parts of the farm house; (2) develop a set of recommendations for the design of certain features of farmhouses, based on an examination of available environmental data for this region and knowledge of human needs for comfort and health; and (3) use the basic planning data developed in (1) and (2) in compiling lists of unit space requirements and desirable features for homes, and in the preparation and evaluation of farmhouse plans. Participating States--Federal-grant projects--Ariz., Cal., Colo., Mont., Wash. Coop. CHRB

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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS



SEPTEMBER 1956

ECONOMICS OF MARKETING

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Section a: Field Crops

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Prepared primarily for the use of workers in agricultural
research in the subject-matter areas presented.

Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State Agricultural Experiment Stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State Agricultural Experiment Stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project (if several States are working cooperatively). Most of the regional and a number of individual State projects involve cooperation with various agencies of the USDA. For cooperative projects between the United States Department of Agriculture and State stations, consult the summary of research projects reported by the Central Project Office. Because of diverse interest and in order to provide appropriate reference, certain projects are listed in more than one subject field.

The relevant regional projects and the titles of the contributing State projects, appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC- North Central, NE- Northeastern, S- Southern and W- Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

Marketing projects are classified on the basis of commodities and of marketing functions. The commodities are presented in seven sections. The other sections and the commodities are as follows:

- Section b - Fruits and Vegetables
- " c - Livestock, Meats, and Wool
- " d - Dairy Products
- " e - Poultry and Poultry Products
- " f - Forest Products, and Ornamental and Drug Plants
- " g - Cross Commodity and Functional Studies

In each Section the projects are grouped according to functions in the marketing process, as indicated in the "Contents." Kinds of studies under each function are indicated below. This should prove helpful in understanding readily the segments of the marketing process covered by present projects and the relative emphasis being given to each segment.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

MAJOR MARKETING FUNCTIONS AND TYPE OF STUDIES INCLUDED UNDER EACH

1. Market Structure and Practices
Marketing channels; organization of markets; operating policies and buying and selling practices in handling, storing, and distribution; availability and needs for facilities and services at various stages in the marketing process; competitive structure of markets; integration in the marketing process; impacts of technological changes.
2. Demand, Consumption, and Prices
Elasticities of demand; demand schedules and changes in aggregate consumer demands; consumption trends; competitive position of different products; prices at different market levels--farm, wholesale, and retail--and their relationships; product utilization patterns; pricing policies; quality premiums and discounts; how prices are determined.
3. Consumer Preference and Merchandising
Forms and amounts of family purchases; methods of processing and preparation for acceptability; consumer preference and buying behavior; motivations underlying consumer practices in buying; product promotion and buying practices; measuring potential demand for new and improved products or services; product development and market testing.
4. Grades, Standards, and Inspection
Identification and measurement of quality; formulation of grade standards; development and improvement of quality testing and measuring techniques and procedures.
5. Market Information
Developing outlook and situation reports and forecasts; methods of improving statistical reports and news service releases on market receipts and movements, prices, stocks; ways of disseminating market information; kinds of market information needed and forms in which it is most useful; ability to use market information; methods of obtaining information; accuracy of information.
6. Maintaining and Improving Quality
Economic aspects of measures to preserve and control quality and avoid losses of quality of products; facilities for proper storage; grading and quality improvement programs.
7. Costs, Margins, and Efficiency of Operations
Mark-ups, spreads, and discounts; the composition of margins, operating costs and returns and their measurement; input-output relationships and economies of scale; design and operation of facilities and equipment; work methods and organization; factors affecting efficiency.
8. Transportation, Location, and Interregional Competition
Transportation rates and charges; effect of rate structure and movement of products; truck versus rail movement of products; transportation costs as related to price and production patterns; influence of transportation cost upon scale of operation of processing plants; inter-State trade barriers.

9. Cooperatives

Services rendered and charges made; efficiency of operations, membership relationships; methods of financing; internal management policies and practices; function and place in the marketing system.

10. Government Programs

Public regulation of markets, product quality, and trading practices; impacts of parity formulas, price supports, surplus removals, and storage, consumption and diversion programs, etc., on particular commodities and groups of commodities and the agricultural economy in general.

11. Miscellaneous

GRAINS

Market Structure and Practices

- Ark. An Economic Appraisal of the Marketing of Soybeans and Small Grains Grown in Arkansas. To (1) determine present areas of production, methods of marketing, availability, and location of marketing facilities, and location, type and cost of storage available for grain crops; (2) evaluate present methods of marketing and present marketing facilities for handling grain crops produced in Arkansas; (3) estimate present use of feed grains and their source of supply, and estimate future grain demands; and (4) investigate competitive position of Arkansas grown feed grains in terms of prevailing marketing methods and facilities and present and potential demand.
Rur. Econ., Soc. 375 (SM-11)
- Ga. Georgia Grain Marketing Problems. To (1) describe and evaluate present methods of handling, distributing and using grains in Georgia; (2) evaluate grain prices in relation to prices in other areas, types of use, grade and quality, and seasons of year; (3) determine extent of quality deterioration by types of storage, and geographic areas as affected by methods of harvesting and management; (4) relate quality deterioration under different storage types to cost of storage and normal seasonal variations in price; and (5) evaluate present methods of storage and marketing in terms of probable alternatives as determined by results of this investigation.
Agr. Econ., Agr. Engin., Agron. 302 (SM-11)
- Ill. Economics of Grain Storage. To analyze the economics of grain storage in order to make the storage facilities more effectively serve the needs of farmers, marketing agents, and consumers as well as to improve efficiency of the present and potential storage facilities. Also to (1) evaluate economic considerations influencing capacity, type, and location of grain storage facilities; (2) determine economics of quality changes which occur under different methods and periods of storage; (3) analyze storage costs and factors influencing them under various alternative storage conditions; and (4) analyze and evaluate public grain warehouse legislation and administration in various states.
Agr. Econ. 05-355 (NCM-10)
- Ind. Economics in Grain Storage. To determine (1) over-all grain storage needs at terminal level in terms of capacity, market location, investment requirements, and other similar criteria, and evaluate these needs in relation to existing facilities; (2) over-all grain storage needs at country elevator level - same as in (1); and (3) effect of vertical and horizontal integration at both terminal and country elevator levels on cost and efficiency of grain storage.
Agr. Econ. 794 (NCM-10)

Iowa

Analysis of Methods, Practices, and Costs of Storage and Marketing of Feed Grains and Soybeans, and the Processed Products of These Crops. To (1) determine relative economics of various methods and types of grain storage under alternative conditions; (2) determine most economic use for the several types and qualities of feed grains and their products; and (3) evaluate effectiveness of present grain marketing methods, facilities, and over-all structure in Iowa in view of current and anticipated trends.

Econ., Soc. 1224 (NCM-10)

Kans.

Marketing of Grain and Purchasing of Feeds. To study (1) marketing of Kansas grain and purchasing of feeds; and (2) price movements and method of price determination of these commodities.

Agr. Econ. 143

Kans.

Economics of Grain Storage. To (1) improve the efficiency of present and potential grain storage facilities, specifically, to evaluate conditions influencing size, type and location; (2) determine economics of shrinkage and quality deterioration; and (3) analyze storage costs and factors influencing them under various alternative conditions.

Agr. Econ. 384 (NCM-10)

Kans.

Organization of the Market for Wheat. To analyze (1) structure of wheat marketing systems to establish criteria to assist in marketing of wheat as required by changing techniques of production and consumer demand; and (2) impact of recent advances and developments of technology of wheat production to determine related adjustments needed in marketing system to provide efficient movement of wheat from producers to consumers.

Agr. Econ., Milling Ind. ES 270

Kans.

Organization of the Market for Feed Grains and Feedstuffs. To (1) establish criteria to assist in marketing of feed grains and feedstuffs as required by changing techniques of production, very rapidly shifting areas of use and changing market outlets; and (2) determine related adjustments needed in marketing livestock feed and feed grains.

Agr. Econ. ES 271

Minn.

Economics of Grain Storage. To (1) learn overall storage needs at terminal and country levels, and evaluate existing facilities in terms of these needs; (2) evaluate existing storage capacity, handling facilities, and storage volume in relation to market location and merchandising functions of various grain merchandisers and processors; and (3) learn what integration and trends toward consolidation exist among grain merchandising and processing firms, and the operational advantages and disadvantages with respect to bulk grain storage of such integration.

Agr. Econ. 1122 (NCM-10)

N. C.

Opportunities for Increasing the Economic Efficiency of Grain Marketing and Utilization in North Carolina. To (1) determine the present system of handling, storing, transporting, and utilization of grain in N. C., including a. to find out how much grain is produced on farms in N. C., and how it is handled by farmers; b. to determine present storage policies, facilities, and charges; c. to determine for grain, present transportation facilities, practices and charges; and d. to indicate the present uses of grain in N. C.; (2) estimate the present and potential demand and outlets for N. C. grain and to evaluate the adequacy of marketing system to meet the present and potential demand, including a. to estimate the present utilization of grain in N. C. and future demand; b. to evaluate the adequacy of transportation services for grain in N. C.; c. to evaluate the adequacy of storage facilities for Grain in N. C.; and d. to investigate the competitive position of grain in the agricultural economy of N. C. and (3) determine what storage and transportation facilities and organizations are needed, and where they are needed.

Agr. Econ., Agr. Engin. HM-1 (SM-11)

Ohio

Economic Analysis of Grain Storage in Ohio. To (1) determine capacity, type, and location of grain storage facilities in Ohio and evaluate economic consideration influencing types and locations of new storage facilities. (2) discover possibilities for improvement in size, lay-out, location and organization of bulk grain storage facilities operated by terminal grain elevator and processing companies, in order to increase efficiency of grain marketing systems as a whole in North Central States; (3) classify all elevator storage facilities into groups according to service and capacities, and to compare storage of each group (such as terminal, subterminal, truck terminal, etc.), with a specific marketing area to the production of corn, wheat, oats and soybeans, within same area. (4) establish geographical marketing areas for grain in Ohio as determined by movement of local grain to terminal or sub-terminal which would be center of area; (5) analyze need for each type of storage within each geographical marketing area as determined by needs for storage within the area; (6) determine amount of suitable storage for grain on Farms in Ohio and length of time each grain is stored in farmer storage; and (7) investigate economy that can arise thru elimination or modification of transiting grain thru Buffalo, or other markets when it could be shipped direct to processor.

Agr. Econ., Soc. 188 (NCM-10)

S. Dak.

Grain Marketing Practices and Problems in South Dakota. To (1) determine and analyze major economic problems in marketing South Dakota grain products for purpose of determining improved marketing techniques; (2) investigate existing grain marketing framework, including ascertaining relevant physical characteristics of grain marketing in the state. and (3) determine the underlying physical and economic forces contributing to prevailing grain marketing practices.

Agr. Econ. 224 (NCM-10)

Tex.

Marketing of Small Grains in Texas. To (1) describe present system of receiving, selling, handling, storing, distributing and using small grains in Texas, including determinations of: a. geographic distribution of grain production and methods used by producers in handling each grain; b. advisability of a system of grades and standards for buying small grains; c. present storage practices, facilities and charges; d. present transportation facilities, practices and charges; and e. present users and handlers of grain; and (2) determine present and potential demands for grain in Texas and evaluate adequacy of marketing system to meet present and potential demand.

Agr. Econ., Soc., Agr. Engin. 932 (SM-11)

Demand, Consumption, and Prices

Ill.

The Marketing System for Soybeans and Soybean Products and the Market for Soybean Oil. To (1) determine and describe the precise manner in which prices of soybeans are determined, and the influence of technicalities of marketing system on soybean prices; (2) determine nature of expectation, manner of their formation, and their influence on soybean prices; (3) determine competitive position of soybean oil among edible and technical vegetable oils and factors affecting users' acceptance of various oils; and (4) examine world trade in edible oils and oilseeds and factors in world price structure for these.

Agr. Econ. 05-354

Ill.

The Formula Feed Industry as a Market for Illinois Grains and Grain and Soybean Products. To (1) appraise the importance, current and future, of formula feed industry as an outlet for Illinois grains and grain products, particularly soybean meal; and (2) describe utilization pattern of soybean meal produced and consumed in Illinois.

Agr. Econ. 05-356

Ill.

Spatial Differences in Soybean Prices. To (1) describe differences in and changes in differences in price of soybeans at various major locations in United States; and (2) learn factors affecting spatial differences in price.

Agr. Econ., Agron. 05-357

Ill.

Pricing and Trading Practices for Grain in Illinois. To (1) determine and describe the current spatial price patterns, associated grain movements and trading practices for grain in Illinois; (2) determine shifts that have occurred in spatial price patterns and trading practices since 1946 and their effects on grain movements; (3) determine and analyze the causes of these shifts and to relate price pattern changes to changes in trading practices and grain movement; and (4) evaluate the trends discovered as an aid in forecasting the direction of grain price pattern and grain movement changes over the next decade.

Agr. Econ. 05-372 (NCM-1)

Ind. Causes of Imperfections in Local Indiana Grain Markets. To (1) determine variations in the relation between grain prices at terminal markets and at various local points in Ind.; (2) determine different local market conditions which explain variations found above; and (3) formulate possible corrective measures to attain more perfect local markets.

Agr. Econ. ES 251

Iowa Pricing and Trading Practices for Grain in Iowa. To (1) determine and describe the present day spatial price patterns and trading practices for grain in Iowa; (2) determine what shifts have occurred in these patterns and practices over the past decade and their effects on grain movements; (3) determine and analyze the causes of these shifts relating where possible price pattern changes with trading practice changes; and (4) assess the trends discovered as an aid to forecasting the direction of grain price pattern and grain movement changes in the region over the next decade.

Agr. Econ., Soc. 1342 (NCM-19)

Kans. Pricing and Trading Practices for Grain in Kansas. To (1) determine and describe current spatial price patterns and trading practices for grain in Kansas, what shifts have occurred in these over the past decade, and their effects on grain movement; (2) determine and analyze causes of these shifts relating where possible price changes with trading practice changes; and (3) assess discovered trends as an aid to forecasting the direction of grain price pattern and grain movement changes in the state over the next decade.

Agr. Econ. 483 (NCM-19)

Minn. Economics of Grain Marketing. To analyze: (1) supply, demand, and price relationships of grains that are of importance to producers, merchandisers, and processors in Minn.; and (2) pricing policies, costs, and margins of grain marketing firms.

Agr. Econ. 1125

Mo. Economic Analysis of Marketing of Grains With Special Emphasis on Buying and Pricing Practices at Country Elevators. To discover (1) the effect of quality and locational differences on the level of prices and the price differentials of grain in Missouri; (2) the relationship between prices paid farmers and terminal market prices, and the factors that affect these relationships; (3) existing spatial price patterns based on price influencing factors which no longer exist; (4) the non-price methods of competition used by grain buyers; and (5) to study the impact of these factors on efficiency of grain marketing in the state.

Agr. Econ. 299 (NCM-19)

Mont.

Preliminary Investigation of the Market Structure, Prices, and Price Policies for Wheat With Particular Reference to Montana Wheats.

To (1) describe market mechanisms for wheat and their price making roles; and (2) find sources of information and appropriate research techniques for use in a subsequent project, the objectives of which will be: a. to analyze current and past domestic and foreign demand for wheat especially classes and qualities of wheat produced in Western Region; b. to analyze current and past domestic and foreign supply conditions for wheat, especially that produced in Western Region; and c. to determine differences in price for and quantity of principal kinds of western wheats that may result from various national wheat price and production policies.

Agr. Econ. M.S. 911, 119 (WM-13)

Nebr.

Pricing and Trading Practices for Grain in Nebraska. To (1) describe methods of price determination for wheat, corn and other grain produced or sold in state; and (2) study recent changes in marketing methods which have caused changes in system of pricing grain.

Agr. Econ. 525 (NCM-17)

N. Dak.

Price Quality Relationships for North Dakota Grain. To (1) determine and describe price patterns, selling practices and their effect on grain production and movement; and (2) study price-quality relationships, and market preference and demand for high quality versus low quality grains.

Agr. Econ., Agron. 3-10M (NCM-19)

N. Dak.

Pricing and Storing Process in Marketing North Dakota Grains. To (1) determine characteristics of pricing process for various types and grades of North Dakota grains; (2) trace effect of various storage facilities and costs upon grain marketing practices in North Dakota; and (3) study effect of various marketing practices upon producer prices and income.

Agr. Econ. 3-2 (NCM-10)

Ohio

Pricing and Trading Practices for Grain in Ohio. To (1) determine and describe the present day spatial price patterns and trading practices for grain in Ohio; (2) determine what shifts have occurred in these patterns and practices over the past decade and their effects on grain movements in the state; (3) determine and analyze the causes of these shifts relating where possible price pattern changes with trading practice changes; and (4) assess the trends discovered as an aid to forecasting the direction of grain price pattern and grain movement changes in the state over the next decade.

Agr. Econ., Rur. Soc. 160 (NCM-19)

Wis.

Pricing and Trade Practices for Grain and Grain Products in Wisconsin. To (1) determine the price making forces for grain; (2) note the principal channels through which grain flows to points of utilization or consumption; and (3) observe the major trade practices and their influence upon the movement of grain from points of origin.

Agr. Econ. 984 (NCM-19)

Consumer Preference and Merchandising

Ark.

Offerings in the Market of Various Forms of Rice and Methods of Processing and Preparing the More Nutritious Forms of Rice to Increase Their Marketability. To (1) determine in the purchase of rice, the forms and amounts purchased by families in retail outlets; and (2) study and develop methods of processing and preparation for the more nutritious forms to insure their acceptability in the market and in the home.

Home Econ., Rur. Soc., Chem. 383 (SM-13)

Grades, Standards, and Inspection

Miss.

Development of New or Improved Techniques or Methods for The Testing of Agricultural Seed. To (1) evaluate lack of uniformity in germination tests conducted by different seed testing labs; and (2) develop or improve testing procedures for specific crop seeds.

Seed Proc., Agron. FSP-2

Maintaining and Improving Quality

Ark.

Improved Marketing of Grains Through Insect Control. To (1) investigate kinds of insects damaging cash grain in farm storage and evaluate the effects on quality and market value of the grain; (2) determine sources of infestations and factors favoring population increases and correlate cost of controlling these factors; (3) determine importance of various species and evaluate factors contributing to their development; and (4) determine better methods for direct and indirect controls and evaluate these in terms of cost, change in quality, and market value.

Ent., Agr. Econ., Soc. 391

Ark.

The Effects of Variations in Moisture, Temperature, and Time During the Drying and Storage Process Upon the Market Value of Rice. To reduce (1) amount of checking in conditioning and drying processes and thereby increase market value of rice; and (2) time required to condition and dry a given lot of rice and thereby reduce amount of storage damage during and after drying.

Agr. Econ., Rur. Soc. 435

S. Dak.

The Use of Crop Drying and Crop Conditioning Machinery and Equipment for South Dakota Crops. To (1) test practicability of conditioning wheat in storage by small electric motors and single air distribution ducts (in cooperation with Commodity Research Division, Grain Branch, on CCC wheat in storage. Minimum requirements of air flow and tube size will be learned); (2) develop equipment for coordinating and comparing drying of crops in typical farm buildings as compared to carefully controlled conditions of experimental crop drying; (3) equip a building and arrange equipment suitable for controlled drying tests on grain and hay crops; and (4) make available all crop drying equipment for careful research tests and for drying of crops under field conditions.

Agr. Engin., Agr. Econ. 246

Costs, Margins, and Efficiency of Operations

Ohio

Marketing Costs and Pricing Methods of Grains in Ohio. To improve the methods of pricing so they will more nearly reflect actual costs of performing the function. Principle areas of study are: (1) determining cost and problems involved in purchasing grains by various methods at local elevator; (2) developing methods of price discounting and charges that will reflect handling and conditioning costs and value of grains at the local elevator; and (3) learning returns and benefits to either farmer or elevator by pricing or purchasing corn on a shelled weight basis.

Agr. Econ., Agron. ES 360

Tex.

Marketing Efficiencies, Costs and Quality Improvement of Grains in the Gulf Coast Area as Affected by Farm Drying and Storage. To (1) make marketing study of economies involved in farm drying and storage of rice and grain sorghums in comparison with grain disposal immediately after harvest; and (2) determine effectiveness of recently installed mechanical drying and aeration equipment for improving quality of grain immediately after harvest and for maintaining quality during storage.

Agr. Econ., Engin. 940

Transportation, Location, and Interregional Competition

Iowa

Patterns, Costs and Economic Efficiency of the Transportation of Iowa Cash Grain With Emphasis on Truck Movement. To (1) determine comparative costs of alternative means of transporting Iowa cash grains and soybeans in view of production patterns, marketing and processing facilities, and seasonal and geographical price patterns; (2) evaluate factors in increasing importance of truck movement of grains, with view to projecting emplitude and geographical structure of this trend; and (3) determine probable optimum course of action for firms marketing Iowa grains in order to maximize efficiency and efficiency of Iowa grain marketing system as a whole.

Agr. Econ., Rur. Soc. 221

Mass. The Structure and Relationship of Freight Rates on Feed to Poultry Feed Prices in the East. To determine (1) influence of freight rates structure on feed moving into eastern broiler producing areas; (2) relationship of freight rates to feed prices, methods of pricing and organization and structure of the feed industry; (3) influence of transportation factors on location and scale of feed mixing plants and methods and channels of feed distribution; and (4) influence on (1), (2), and (3) of important features of transportation situation, e.g. transit privilege for rail movement, importance of trucking, and influence of waterways.

Agr. Econ. 42

Nebr. Transportation and Storage of Nebraska Grain. To (1) analyze methods of grain transportation and storage to find ways to make these facilities more effectively serve needs of farmers, middlemen, and consumers as well as improve efficiency of present and potential storage and transportation facilities; (2) describe present capacity, type, and location of grain storage and transportation, and measure efficiency of existing and alternative facilities; (3) analyze effects of quality changes which occur under different methods and periods of storage and transportation; (4) measure and analyze storage and transportation costs, and factors influencing them under various alternative conditions; and (5) evaluate public grain warehouse legislation and administration in Nebraska.

Agron., Agr. Engin. 421 (NCM-10)

Okla. Storage Requirements for Oklahoma Wheat. To learn needed storage capacity and distribution of storage facilities to efficiently market wheat in Okla.

Agr. Econ. 854, ES 280,

Cooperatives

Ill. Analysis of Problems Confronted by Management in Farmers' Cooperatives. To (1) obtain, analyze, and interpret data on specific problems of cooperatives; (2) study the methods on financing of cooperatives; and (3) discover types and amount of costs involved in operating different types and sizes of cooperative grain elevators.

Agr. Econ. 05-351

Government Programs

Iowa Corn Price and Income Policy. To (1) analyze objectives of the corn price and acreage program; (2) examine methods used to attain objectives; (3) determine effects of corn price and acreage control program on: a. acreage, yield, and production of corn and other feed crops and livestock, b. storage stocks of corn and other feed crops, and c. prices of corn and other feed crops, and livestock; (4) compare effects of program with objectives of the program; and (5) estimate effect of various proposed alternative programs.

Agron., Agr. Econ. 1241 (NCM-11)

- Iowa Alternative Parity Formulas for Price Support Programs. To (1) develop and appraise more accurate parity formulas for farm products; and (2) set up alternative marketing objectives of price support programs, i.e., stabilization of market supplies, stabilization of prices, stabilization of incomes, raising the level of incomes, etc. and develop appropriate price, cost, and other bases and formulas that could be used for carrying the programs through toward alternative objectices.
Agr. Econ. 1281 (NCM-11)
- Kans. Wheat Price and Income Policy. To (1) analyze objectives and methods used in past and existing wheat programs; (2) estimate money costs of programs to consumers and taxpayers; (3) describe past programs for wheat; (4) learn effects of past wheat programs on farm income, both size and stability, wheat prices, level, seasonal fluctuations, relation to other farm prices, volume and location of wheat production, domestic use and export use, use of agricultural resources, including size and organization of firms and technological advances, resource prices, especially wheat land, marketing agencies and processors, and community organization; and (5) use data to predict nature of changes that could result from alternative wheat programs.
Agr. Econ. 439 (NCM-11)
- Ohio Wheat Price and Income Policy. To (1) analyze methods used and costs of wheat price and income support programs in Ohio; (2) estimate effects of past wheat programs on farm income, wheat and other farm prices, wheat production, farm organization, marketing organization, costs and practices, and storage operations; and (3) apply above information so as to predict nature of changes to be expected from alternative policy programs which may be considered in the future.
Agr. Econ., Soc. 125 (NCM-11)
- Oreg. Production and Marketing of Pacific Northwest Wheat Under Selected Programs. To appraise plans or programs for wheat to determine the probable effects of each of several plans on the production and marketing of wheat in the Pacific Northwest over a ten-year period.
Agr. Econ. 164
- S. Dak. Wheat Price and Income Policy. To ascertain social and economic effects of government program from these points of view: (1) volume and location of wheat production; (2) use of agricultural resources, land, labor, equipment, fertilizer, and other supplies; (3) production of other agricultural products; (4) wheat prices, size of farms, distribution and size of farm income; (5) size and mobility of farm population; (6) size and stability of real and money national income; and (7) milling quality and supplies of desired milling varieties of wheat.
Agr. Econ. 263 (NCM-11)

Tex. An Evaluation of the Rice Price Support Program. To (1) measure and appraise effects of federal price support, agricultural adjustment and surplus removal programs upon supply, domestic and foreign consumption, markets, prices, and gross incomes for rice; (2) measure and appraise effects of rice program in terms of concurrent changes in farm enterprise combinations, market systems, interrelationships of product, and factor prices for rice; and (3) study interconnections of programs for rice with programs for other farm commodities important in the South's agriculture, and to examine the interaction of effects of such programs.

Agr. Econ., Soc. 942 (SM-14)

Wash. Wheat Prices and Price Policies in the Pacific Northwest. To analyze (1) price structure for wheat with reference to relation of prices of soft and hard Pacific Northwest wheats to prices of other wheats in both U. S. and world markets; (2) short-run and long-run effects of different levels of wheat prices on production of and income from wheat in Washington under conditions of no production controls; and (3) effect of various alternative price and production controls for wheat on structure of wheat prices, on structure of agricultural production, and on income from agriculture in Washington.

Agr. Econ., Agron. 1223 (WM-13)

Miscellaneous

Mo. Economic Problems of Grain Marketing and Grain Storage. To (1) make detailed compilation and analysis of laws of state governing grain storage, and of practices of bonding companies, insurance companies, and other financing agencies contributing to grain storage in Mo.; (2) learn volume, kind, location, and use of existing processor, terminal, sub-terminal, and local grain storage facility in Mo., for purpose of analyzing their adequacy in view of present and future grain marketing patterns, and in coordination with similar studies in other states, to contribute to a similar objective of the No. Cen. Regional Mktg. Research program; and (3) develop more information to assist operators of country elevators in remodeling, re-locating, and rebuilding local market facilities consistent with the trends in marketing techniques.

Agr. Econ. 179 (NCM-10)

REGIONAL PROJECTS

NCM-10

Economics of Grain Storage. The general objective is to analyze the economics of grain storage in order to make the storage facilities more effectively serve the needs of farmers, marketing agents, and consumers as well as to improve the efficiency of the present and potential storage facilities. Specific objectives are: To (1) evaluate the economic considerations influencing capacity, type, and location of grain storage facilities; (2) determine economics of quality changes which occur under different methods and periods of storage; (3) analyze storage costs and factors influencing them under various alternative storage conditions; and (4) analyze and evaluate public grain warehouse legislation and administration in the various states.

Contributing State Projects:

- Ill., 05-355, Economics of Grain Storage. (page 1)
- Ind., 794, Economics In Grain Storage. (page 1)
- Iowa, 1224, Analysis of Methods, Practices, and Costs of Storage and Marketing of Feed Grains and Soybeans, and the Processed Products of These Crops. (page 2)
- Kans., 384, Economics of Grain Storage. (page 2)
- Minn., 1122, Economics of Grain Storage. (page 2)
- Mo., 179, Economic Problems of Grain Marketing and Grain Storage. (page 11)
- Nebr., 421, Transportation and Storage of Nebraska Grain. (page 9)
- N. Dak., 3-2, Pricing and Storing Process in Marketing North Dakota Grains. (page 6)
- Ohio, 108, Economic Analysis of Grain Storage in Ohio. (page 3)
- S. Dak., 224, Grain Marketing Practices and Problems in South Dakota. (page 3)

Measuring and Appraising the Impact of Agricultural Price and Income Policy Upon Producers, Marketing Agencies, and Consumers.
To measure and appraise the impacts of agricultural price and income policies and programs upon producers, marketing agencies, consumers, and other economic groups.

Among the impacts to be studied are changes in: (a) prices, (b) farm incomes (in terms of size and stability), (c) volume and location of production, (d) consumption, imports, and exports, (e) costs of programs, (f) use of resources, and (g) resource prices.

Contributing State Projects:

- Iowa, 1241, Corn Price and Income Policy. (page 9)
- Iowa, 1281, Alternative Parity Formulas for Price Support Programs. (page 10)
- Kans., 439, Wheat Price and Income Policy. (page 10)
- Kans., 385, Goals, Means, and Effects of Agricultural Policies. (See Part 2, Sec. A)
- Mo., 115, Measuring and Appraising the Impact of Agricultural Price and Income Policies Upon Producers, Marketing Agencies, and Consumers. (See Part 2, Sec. A)
- Nebr., 451, Measuring and Appraising the Impact of Agricultural Price and Income Policy Upon Producers, Marketing Agencies, and Consumers. (See Part 2, Sec. A)
- N. Dak., 3-6, Impact of Wheat Price Support Programs on Wheat Production, Marketing and Farm Income in North Dakota. (See Part 2, Sec. A)
- Ohio, 125, Wheat Price and Income Policy. (page 10)
- S. Dak., 263, Wheat Price and Income Policy. (page 10)

Pricing and Trading Practices for Grain in the North-Central Region. To (1) determine and describe the present day spatial price patterns and trading practices for grain in the region; (2) determine what shifts have occurred in these patterns and practices over the past decade and their effects on grain movements in the region; (3) determine and analyze the causes of these shifts relating where possible price pattern changes with trading practice changes; and (4) assess the trends discovered as an aid to forecasting the direction of grain price pattern and grain movement changes in the region over the next decade.

Contributing State Projects:

- Ill., 05-372, Pricing and Trading Practices for Grain in Illinois.
(page 4)
- Iowa, 1342, Pricing and Trading Practices for Grain in Iowa.
(page 5)
- Kans., 483, Pricing and Trading Practices for Grain in Kansas.
(page 5)
- Mo., 299, Economic Analysis of Marketing of Grains with Special Emphasis on Buying and Pricing Practices at Country Elevators. (page 5)
- Nebr., 525, Pricing and Trading Practices for Grain in Nebraska.
(page 6)
- N. Dak., 3-10M, Price-Quality Relationships for North Dakota Grain.
(page 6)
- Ohio, 160, Pricing and Trading Practices for Grain in Ohio.
(page 6)
- Wis., 984, Pricing and Trade Practices for Grain and Grain Products in Wisconsin. (page 7)

Marketing and Utilization of Grain in the South. To determine the present system of receiving, handling, storing, distributing, and utilizing grain in the South. Specific objectives are: To (1) find out how much grain is being produced on farms in each State, and how farmers handle it; (2) determine present storage practices, facilities, and charges; (3) determine for grain, present transportation facilities, practices, and charges; and (4) indicate the present users and handlers of grain.

Contributing State Projects:

- Ark., 375, An Economic Appraisal of the Marketing of Soybeans and Small Grains in Arkansas. (page 1)
- Ga., 302, Georgia Grain Marketing Problems. (page 1)
- N. C., HM-1, Opportunities for Increasing the Economic Efficiency of Grain Marketing and Utilization in North Carolina. (page 3)
- Tex., 932, Marketing of Small Grains in Texas. (page 4)

Effects of Price Support, Acreage Adjustment and Surplus Removal Programs Upon Southern Agriculture. The objectives of the project are to (1) measure and appraise the effects of Federal and State* price support, agricultural adjustment and surplus removal programs upon the supply, domestic and foreign consumption, markets and prices, and gross incomes for farm products important in southern agriculture; (2) measure and appraise these effects in terms of the concurrent changes in farm enterprise combinations, market systems, and inter-relationships of product and factor prices; and (3) study the inter-connection of the programs, and the interaction of their effects.

* Included to cover Puerto Rican programs in tobacco which have state controls over acreage.

Contributing State Projects:

Tex., 942, An Evaluation of the Rice Price Support Program. (page 11)

Wheat Prices and Price Policies in the Western Region. To (1) describe the market mechanisms for wheat and to describe their price making roles; (2) analyze the current and past domestic and foreign demand conditions for wheat with particular reference to the classes and qualities of wheat produced in the Western Region; (3) analyze the current and past domestic and foreign supply conditions for wheat with particular reference to classes and qualities of wheat produced in the Western Region; and (4) determine the differences in price for and quantity of the principal kinds of western wheats that may result from various national wheat price and production policies.

Contributing State Projects:

Mont., 119, Preliminary Investigation of the Market Structure, Prices, and Price Policies for Wheat with Particular Reference to Montana Wheats. (page 6)

Wash., 1223, Wheat Prices and Price Policies in the Pacific Northwest. (page 11)

COTTON AND COTTONSEED

Market Structure and Practices

Ala. Marketing of Cottonseed for Planting Purposes in Alabama. To (1) study and describe organization and operation of existing marketing structure, including agencies, facilities, and legal regulations about cottonseed for planting; (2) determine practices of cotton producers in obtaining seed for planting; (3) learn adequacy of supply of planting seed in relation to demand; (4) evaluate practices of distributing agencies in marketing planting seed; and (5) learn possibilities of improving marketing system for planting seed to reducing costs and improving adequacy and availability of seed of desired quality.

Agr. Econ. 541

Okla. Marketing Practices and Harvesting Methods Affecting Cotton Quality and Net Income From Cotton in Oklahoma. To learn (1) cultural practices followed that affect cotton quality, quantity, price, and income from cotton marketed in Oklahoma; (2) effect of defoliation on cotton quality, price and income; (3) effect of harvesting methods used on quality and income; (4) effect of marketing practices followed, as type of vehicle used for hauling; and (5) combined effect of pre-harvest field preparation, defoliation, harvesting methods and marketing practices on net income from cotton, per bale, acre, and farm.

Agr. Econ., Agron. 907

Tex. Marketing of Cotton Planting Seed. To (1) survey sources of cotton planting seed and determine proportion supplied by each source to Texas growers; (2) determine kinds and amounts of cotton planted in areas to be studied, and when possible to relate information obtained to varietal recommendations; (3) determine supply of various categories of cotton planting seed and to relate these data to most efficient use of each type; (4) appraise various methods used for processing, storage and distribution of cotton planting seed and determine influence of various practices on farmers' preference and acceptance; and (5) evaluate present marketing procedures as to effectiveness in supplying good-quality seed of recommended varieties at a reasonable price.

Agr. Econ., Soc. 918

Demand, Consumption, and Prices

Ariz. Market Potential for Pima S-1 Cotton. To learn (1) changes that have occurred in elasticity of demand for American-Egyptian cotton since the development and commercial use of Pima S-1; (2) market outlets of Pima S-1 and evaluate potential outlets and conditions under which enlarged outlets could be attained; and (3) to develop criteria for a pricing policy for American-Egyptian cotton tending to assure a stable supply and create and maintain a competitive position for enlarged markets

Agr. Econ. 412 (WM-32)

Mo.

A Study of Cotton Marketing in Missouri, Including Pricing Mechanisms in Local Markets, and the Effect of Quality and Market News Services on Price. To discover factors affecting the level of price and the price differentials due to quality differences in local markets, and the effect of quality and price information on price establishment.

Agr. Econ. 65

N. Mex.

Economic Effects of Alternative Methods of Pricing Pima S-1 Cotton. To (1) learn elasticity of demand for Pima S-1 cotton and learn its importance as a guide in pricing; (2) measure economic effect of recent regulation which sets minimum price of Pima S-1 at 75% of parity; and (3) learn present methods for setting price-quality differentials and subjectively appraise their efficiency in relation to surpluses and potential uses of specific qualities.

Agr. Econ. 58 (WM-32)

Tenn.

Factors Affecting Cotton Prices in Local Markets. To determine effectiveness of various local markets in reflecting to farmers the average price level prevailing for cotton, and in reflecting central marketing premiums and discounts in accordance with variations in quality.

Agr. Econ., Rur. Soc. 8

Grades, Standards, and Inspection

Ark.

Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of Cotton. To learn (1) nature and extent of use of measures of differences in fineness, strength, and other fiber properties, in addition to grade and staple length at various stages in marketing; (2) influences of measurements on prices paid for cotton; (3) estimated costs of fiber tests; (4) basis for and adequacy of criteria used by firms in relating fiber testing to value of cotton; and (5) value of fiber testing in appraising cotton breeding and production programs designed to produce qualities of cotton desired by consumers.

Agr. Econ., Rur. Soc. 437 (SM-18)

Ariz.

Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of Cotton. To determine (1) nature and extent of use of measures of differences in fineness, strength, and other fiber properties in addition to grade and staple length at various stages in marketing process; (2) influences of measurements on prices paid for cotton; (3) charges for, or estimated costs of tests; and (4) basis for and adequacy of criteria used by firms in relating fiber testing to value of cotton.

Agr. Econ. 426 (SM-18)

Ga.

Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of Cotton. To learn (1) nature and extent to which differences in fineness, strength, and other fiber properties are used in marketing cotton at various stages; (2) influence of these differences on prices paid for cotton; (3) estimated costs of tests; (4) basis for and accuracy of criteria used by firms in relating fiber testing to value of cotton; and (5) value of fiber testing in guiding cotton breeding and production programs designed to produce qualities desired by consumers.

Agr. Econ. M-17 (SM-18)

N. Mex.

Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of New Mexico Cotton. To learn (1) nature and extent of use of measures of differences in fineness, strength, and other fiber properties and grade and staple length at various stages in the marketing process for New Mexico cotton; (2) influences of these measures on prices paid for cotton; (3) charges for, or estimated costs of tests; (4) basis for and adequacy of criteria used by firms in relating fiber testing to the value of cotton; and (5) value of fiber testing in appraising cotton breeding and production programs designed to produce the qualities desired by consumers.

Agr. Econ. 64 (SM-18)

Tenn.

Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of Cotton. To ascertain (1) the nature and extent of use of measures of differences in fineness, strength and fiber properties in addition to grade and staple length at various stages in marketing process for cotton; (2) influences of these measurements on prices paid for cotton; (3) charges or costs for tests; (4) basis for and adequacy of standards used by firms in relating fiber testing to quality and value of cotton; (5) value of fiber testing in appraising cotton breeding and production programs designed to produce the qualities desired by consumers; and (6) practicability of furnishing growers with additional information on quality of cotton produced.

Agr. Econ., Rur. Soc. 21 (SM-18)

Tex.

Economic Analysis and Evaluation of the Utilization of Fiber Tests in the Marketing of Cotton. To ascertain (1) nature and extent of use of measures of differences in fineness, strength, and other fiber properties in addition to grade and staple length at various stages in marketing of cotton; (2) influence of measures on prices paid; (3) costs for these tests; (4) basis for and adequacy of standards used by firms in relating fiber testing to quality and value of cotton; and (5) learn economic significance of quality and spinning performance of cottons in areas where control could be made of variety, seed renewal, fertilization, harvesting practices, etc.

Agr. Econ., Soc. 1084 (SM-18)

Maintaining and Improving Quality

- Ark. An Evaluation of Cost and Quality of Ginning Services in the Delta Sections on Arkansas. To ascertain (1) quality of ginning services performed by ginning establishments equipped with adequate amounts of cleaning and conditioning equipment for handling machine-picked cotton; (2) cost of providing such services; (3) operating practices and conditions affecting quality of ginning services performed; and (4) comparative advantages to cotton producers from ginning machine-picked and hand-picked cotton at gins using various basic types of lint cleaners.
Agron., Agr. Engin. 385

Costs, Margins, and Efficiency of Operations

- Ariz. The Effects of Fires on Cotton Ginning Costs and Possible Means of Reducing Fire Losses in Arizona. To learn (1) causes and extent of fires occurring in cotton in transit from producer to gin, in gins and in gin baleyards; (2) effectiveness of various fire preventive devices current in state, and evaluate results in terms of effects on ginning costs; and (3) structures of and trends in transit, processing, and baleyard insurance available in Arizona.
Agr. Econ. 392 (SM-17)
- Ga. An Economic Analysis of Effects of Fires on Insurance and Other Costs at Gins. To reduce fire insurance cost to ginners and learn (1) effect of prevention devices and practices on frequency and extent of fires and cost; (2) relation of premiums for gin fire insurance to losses; (3) trends in types of and rates for insurance to ginners; and (4) legal limitations and regulations of fire insurance companies.
Agr. Econ., Agron. M-14 (SM-17)
- La. A Study of the Marketing of Cotton and Cottonseed and the Economics of Cotton Gin Operation in Louisiana. To (1) analyze economic position of the cotton ginning industry in Louisiana and determine relationship between ginning rates and services performed, factors influencing cost of ginning, and ways in which this cost might be reduced in order to serve cotton producers more efficiently; (2) study methods of marketing cottonseed in Louisiana in order to determine its effectiveness in serving the needs of the cotton producers and others, in particular, seeking information on effectiveness of competition in purchase of cottonseed, relationship between price of cottonseed and various stages of marketing and price of products made from the seed, etc; (3) analyze methods of marketing cotton in order to determine adequacy of market news information, to explore opportunities of new marketing methods, and to encourage use by producers of available marketing aids in marketing their crops; and (4) estimate, in cooperation with Cotton Branch of PMA, the grade and staple length of cotton produced in Louisiana and to work in cooperation with them in carrying out provision of Smith-Doxey Act and other related programs.
Agr. Econ. 467

La.

An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Cotton Gins. To learn (1) effect of fire prevention devices and practices on frequency and extent of gin fires, and costs to ginners; (2) relation of premiums for gin fire insurance to losses associated therewith; (3) trends in types and rates for fire insurance for ginners; and (4) legal limitations and regulations of fire insurance companies.

Agr. Econ. 899 (SM-17)

Miss.

An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Cotton Gins. To learn (1) effect of preventive devices and practices on frequency and extent of gin fires, and related costs to ginners; (2) relation of premiums for gin fire insurance to associated losses; (3) trends in types of and rates for fire insurance for ginners; and (4) legal limitations and regulations of fire insurance companies.

Agr. Econ. HA-22, RRFA-10 (SM-17)

Mo.

Effects of Fires on Insurance and Other Ginning Costs. To (1) determine legal and regulatory framework in which fire and accident insurance companies serving cotton gins operate; (2) effect of prevention devices and practices on frequency and extent of gin fires and accidents and their relation to costs; and (3) the relation of premiums and credits for use of these devices and practices.

Agr. Econ. 288 (SM-17)

Okla.

An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Cotton Gins. To learn (1) effect of preventive devices and practices on frequency and extent of gin fires, and related costs to ginners; (2) trends in types of and rates for fire insurance available to ginners; and (3) relation of premiums for gin fire insurance to losses.

Agr. Econ. 927 (SM-17)

Tenn.

An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Gins in Tennessee. To learn (1) relation of premiums for gin fire insurance to losses associated therewith; (2) trends in types of and rates for fire insurance available to ginners; and (3) legal limitations and regulations of fire insurance companies.

Agr. Econ., Rur. Soc. 18 (SM-17)

Tex.

An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Texas Gins. To learn (1) effect of prevention devices and practices on frequency and extent of gin fires, and related costs to ginners; (2) relation of premiums for gin fire insurance to losses associated therewith; (3) trends in types of and rates for fire insurance for ginners; and (4) legal limitations and regulations of fire insurance companies.

Agr. Econ., Soc. 1072 (SM-17)

Government Programs

Ark. Effects of Price Support, Acreage Adjustment and Surplus Removal Programs for Cotton Upon Arkansas Agriculture. To (1) analyze and appraise effects of Federal price support, acreage adjustment and surplus removal programs upon the supply, domestic and foreign consumption, markets, and prices, and gross income from cotton lint; (2) analyze and appraise effects of cotton programs in terms of concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for cotton; and (3) study interconnections of programs for cotton with other programs, either farm commodities or farm practices important in Arkansas and the South, and examine their interactions.

Rur. Econ., Rur. Soc. 387 (SM-14)

Ga. Effects of Governmental Price and Income Policy Upon Georgia Cotton Producers. To (1) analyze and appraise the effects of the cotton programs in terms of concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for cotton; (2) study effects of the cotton programs on supply, demand, price, markets, and gross income; and (3) study impacts of cotton program on resource use in production and marketing and evaluate impacts of cotton program on farm enterprise combinations by considering shifts of cotton production among farms within similar areas, among areas within States, and among larger regional areas.

Agr. Econ. M-11 (SM-14)

Miss. Market Outlet and Supply Adjustments - Impact of Price Support and Acreage Control Programs on the Supply of Farm Products to Marketing Agencies. To estimate the effect, for farm commodities which compete with cotton, on supply of a change in relative price of cotton and other commodities produced in the area when (1) prices of other commodities are not supported; (2) prices of other commodities are supported without production controls; and (3) prices of other commodities are supported in conjunction with production controls.

Agr. Econ. HA-10

Miss. Effects of Price Support, Acreage Adjustment and Surplus Removal Programs Upon Southern Agriculture. To (1) measure and appraise effects of Federal price support, acreage adjustment and surplus removal programs upon supply, consumption, markets and prices, and gross income from cotton; (2) measure and appraise effects of cotton programs in terms of concurrent changes in farm enterprise combinations, market systems and interrelationships of product and factor prices for cotton; and (3) study interconnections of programs for cotton with programs for other commodities important in Miss. agriculture, and examine interaction of effects of such programs.

Agr. Econ. RRFA-7 (SM-14)

Okla. Effects of Cotton Price Support, Acreage Adjustment, and Surplus Removal Programs Upon Oklahoma Agriculture. To analyze and appraise the effects of (1) Federal price support, acreage adjustment, and surplus removal programs upon the supply, domestic and foreign consumption, markets and prices, and gross income from cotton lint; and (2) cotton programs in terms of concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for cotton.

Agr. Econ. 876 (SM-14)

P. R. Effects of Federal and Commonwealth Programs Upon the Sea-Island Cotton Industry and the Economy of Puerto Rico. To (1) measure and appraise effects of Federal and Commonwealth programs upon supply, consumption, price and gross income for Sea-Island cotton and concurrent changes in farm enterprise combination, market systems, and interrelationships of product and factor prices for Sea-Island cotton; and (2) study interconnections of program for above with other programs for either farm commodities or farm practices important in Puerto Rico, and examine their interactions.

Econ., Rur. Soc. 96 (SM-14)

REGIONAL PROJECTS

SM-14

Effects of Price Support, Acreage Adjustment and Surplus Removal Programs Upon Southern Agriculture. The objectives of the project are: (1) To measure and appraise the effects of Federal and State* price support, agricultural adjustment and surplus removal programs upon the supply, domestic and foreign consumption, markets and prices, and gross incomes for farm products important in southern agriculture; (2) to measure and appraise these effects in terms of the concurrent changes in farm enterprise combinations, market systems, and inter-relationships of product and factor prices; and (3) to study the interconnection of the programs, and the interaction of their effects.

* Included to cover Puerto Rican programs in tobacco which have state controls over acreage.

Contributing State Projects:

- Ark., 387, Effects of Price Support, Acreage Adjustment and Surplus Removal Programs for Cotton Upon Arkansas Agriculture. (page 21)
Ga., M-11, Effects of Governmental Price and Income Policy Upon Georgia Cotton Producers. (page 21)
Miss., RRFA-7, Effects of Price Support, Acreage Adjustment, and Surplus Removal Programs Upon Southern Agriculture. (page 21)
Okla., 876, Effects of Cotton Price Support, Acreage Adjustment, and Surplus Removal Programs Upon Oklahoma Agriculture. (page 22)
P. R., 96, Effects of Federal and Commonwealth Programs Upon the Sea-Island Cotton Industry and the Economy of Puerto Rico. (page 22)

SM-17

An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Gins. To determine (1) the effect of prevention devices and practices on the frequency and extent of gin fires, and related costs to ginners; (2) the relation of premiums for gin fire insurance to losses associated therewith; (3) the trends in types and rates for fire insurance available to ginners; and (4) the legal limitations and regulations of fire insurance companies.

Contributing State Projects:

- Ariz., 392, The Effects of Fires on Cotton Ginning Costs and Possible Means of Reducing Fire Losses in Arizona. (page 19)
Ga., M-14, An Economic Analysis of Effects of Fires on Insurance and Other Costs at Gins. (page 19)
La., 899, An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Cotton Gins. (page 20)
Miss., HA-22, RRFA-10, An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Cotton Gins. (page 20)
Mo., 288, Effects of Fires on Insurance and Other Ginning Costs. (page 20)
Okla., 927, An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Cotton Gins. (page 20)
Tenn., 18, An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Gins in Tennessee. (page 20)
Tex., 1072, An Economic Analysis of the Effects of Fires on Insurance and Other Costs at Texas Gins. (page 20)

Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of Cotton. To determine (1) the nature and extent of the use of measures of differences in fineness, strength, and other fiber properties in addition to grade and staple length at various stages in the marketing process for cotton; (2) the influences of these measurements on prices paid for cotton; (3) charges for, or estimated costs of tests; (4) basis for and adequacy of criteria used by firms in relating fiber testing to the value of cotton; and (5) the value of fiber testing in appraising cotton breeding and production programs designed to produce the qualities desired by consumers.

Contributing State Projects:

- Ariz., 426, Economic Analysis and Evaluation of the Use of Fiber Tests In the Marketing of Cotton. (page 17)
 Ark., 437, Economic Analysis and Evaluation of the Use of Fiber Tests In the Marketing of Cotton. (page 17)
 N. Mex., 64, Economic Analysis and Evaluation of the Use of Fiber Tests in the Marketing of New Mexico Cotton. (page 18)
 Tenn., 21, Economic Analysis and Evaluation of the Use of Fiber Tests In the Marketing of Cotton. (page 18)
 Tex., 1084, Economic Analysis and Evaluation of the Utilization of Fiber Tests in the Marketing of Cotton. (page 18)

WM-32

Market Potential for Pima S-1 Cotton. To (1) determine the elasticity of demand for Pima S-1 cotton, analyze recent changes and determine their importance as a guide in pricing; (2) determine present market outlets of Pima S-1, evaluate potential outlets, and appraise the influence of price-quality differentials on the potential; (3) measure the economic effect of the recent regulation which sets the price of Pima S-1 at 75% parity; and (4) develop criteria for a pricing policy for Pima cotton which would tend to assure a stable supply and create and maintain a competitive position for enlarged market outlets.

Contributing State Projects:

- Ariz., 412, Market Potential for Pima S-1 Cotton. (page 16)
 N. Mex., 58, Economic Effects of Alternative Methods of Pricing Pima S-1 Cotton. (page 17)

OTHER FIELD CROPS

Market Structure and Practices

- Ariz. The Economics of Marketing Hay and Feed Grains in Arizona. To (1) describe movement of hay and feed grains within Arizona and between Arizona and other states in Southwest; (2) describe marketing channels and methods through which movements take place; (3) investigate transportation, adequacy of market information, and storage; (4) describe importance of marketing agencies and outlets regarding volume and efficiency of movement; (5) analyze functions of market mechanisms, and learn costs and margins which are incurred; and (6) analyze and describe role of commercial mixed-feed and processing industries in interstate movements of concentrates.
Agr. Econ. 415 (WM-20)
- Idaho Marketing Idaho Dry Beans. To (1) describe marketing channels for beans, including specific information on movement to learn accurately the disposition of product, services performed in preparing beans for market by marketing agencies, charges by handlers in state; and (2) analyze long term trends of bean industry with reference to acreage and yields, consumption, projection of future trends in acreage, yield, and consumption, marketing channel changes, variety changes.
Agr. Econ. 303
- Ky. Seed Marketing in Kentucky. To (1) discover what market outlets are used by Kentucky seed producers; (2) what processing facilities are available; and (3) how such facilities are used.
Agr. Econ. ES-255
- Mont. A Description and Analysis of the Market Mechanism for the Movement of Important Feed Grains. To (1) describe movement of feed grains between farms within Montana, Western region, and between Western Region and rest of the U. S.; (2) describe marketing channels thru which movements of feed grains take place and marketing methods involved; (3) analyze functions of marketing mechanism; (4) determine costs and margins, and determine reasonableness of such costs and margins in light of services rendered; and (5) isolate and study weaknesses and problems in order to make recommendations for improving marketing of feed grains.
Agr. Econ 122, M.S. 932 (WM-20)
- Nebr. The Processing, Packaging and Marketing of Certified Seed in Nebraska. To (1) describe current practices of processing and packaging of certified seed in state and recommend new procedures; (2) analyze efficiency of processing from cost standpoint; (3) describe present marketing system for certified seed of various crops, including channels of distribution and importance of various types of dealers; and (4) analyze factors determining price of certified seed, buying and selling methods, and inter-regional competition.
Agron., Agr. Econ. ES-462

N. Mex.

The Economics of Marketing Alfalfa Hay and Grain Sorghums in New Mexico. To (1) learn movement of alfalfa hay and feed grains within, out of, and into N. M. and surrounding states; (2) learn marketing and transportation methods used; (3) analyze marketing functions performed and costs and margins incurred, and (4) learn role of feed processors as a demand factor for N. M. alfalfa hay and grain sorghums.

Agr. Econ. 30 (WM-20)

N. Y.
(Cornell)

Current Usage and Potential Demand for Seed of Improved Forage Crop Varieties in the Northeastern States. To (1) obtain reliable data on farm seed purchases of small seeded legumes and grasses by crops and varieties; (2) of wholesale and retail seed trade, obtain an appraisal of problems and progress in seed programs affecting small seeded legumes and grasses; (3) appraise variety testing and extension program on improved varieties of small seeded legumes and grasses in 12 Northeastern states, with a view toward obtaining further direction of recommendations and use of specific forage crops varieties; and (4) establish bench marks on seed usage and variety evaluation to serve as a guide in projecting better seed program of future.

Pl. Br., Agr. Econ., Agron. 89

P. R.

Tobacco Marketing in Puerto Rico. To (1) ascertain various methods and systems of marketing Puerto Rican tobacco; (2) analyze existing market organizations in terms of local and port facilities, methods of receiving, classifying, and processing leaf, sale outlets and other services essential in moving crop marketward; (3) evaluate various tobacco marketing organizations and techniques used as to relative economic advantages; and (4) appraise major problems of selling tobacco to distributors and manufacturers by classification and ultimate use.

Agr. Econ. 60

P. R.

Marketing of Pigeon Peas in Puerto Rico. To (1) determine problems of pigeon-pea producers in marketing their crop; (2) determine adequacy of practices and facilities available for processing or otherwise disposing of pigeon-pea crop; and (3) obtain any further information which may be of help in suggesting changes for improvement of pigeon-pea marketing practices.

Agr. Econ. 76

S. Dak.

Marketing Roughages. To (1) survey methods and practices of marketing important roughages; (2) correlate market values and prices of important roughages in S. D. with their chemical compositions; (3) determine methods commonly used for marketing important roughages in S. D.; and (4) determine pricing system used for important roughages, and if this system is correlated to any large extent with nutritive content.

Anim. Husb., Agr. Econ. 267

Utah

Economics of Marketing Utah Alfalfa Seed. To determine (1) trend in prices received by Utah growers for certified varieties as compared with common alfalfa seed in recent years; (2) advantages of different marketing outlets used by farmers in selling alfalfa seed; (3) selling practices of growers and comparative advantages of selling at harvest time or storing and holding to sell near planting time; (4) effect of "zone designations" and "regions of adaptation" as established by old PMA on market and price for Utah seed; and (5) follow seed thru marketing to final consumer in attempts to determine destinations, margins, variety preferences, and price differentials by varieties.

Agr. Econ. 436

Wyo.

Economics of Producing and Marketing Wyoming's Legume and Grass Seeds. To (1) obtain data to assist legume and grass seed producers in efficient production, harvesting, processing and marketing; (2) determine trends in production, consumption, price, and source of supply of legume and grass seeds; (3) study different market outlets used by producers and their advantages in disposing of seeds, following thru marketing channels to final consumer in attempt to measure marketing costs and efficiencies; and (4) determine trend of prices received by growers for certified vs. non-certified seed.

Agr. Econ. 561

Wyo.

The Economics of Marketing Hay and Feed in Wyoming. To learn (1) movement of hay and feed concentrates between different areas within state, and between different areas in and out of state, with special emphasis on learning areas of origin and destination with description of channel movements; (2) marketing methods and mechanisms by which interstate movement of hay and feed grains is effected; (3) role of commercial feed mixers in interstate movement of feed concentrates; (4) functions performed by market mechanism in interstate movement of hay and feed grains, and costs and margins incurred in market system for such movement, and reasonableness of such cost; (5) (same as for #4 only feed concentrates); (6) amount and kind of feed required from outside for a given area; (7) amount of surplus feed produced in a given area, and where and how feed should be marketed for best longtime returns; and (8) influence of quality and standard grades on prices received, and relative values of same to producer.

Agr. Econ., Agron. 616 (WM-20)

Demand, Consumption, and Prices

Conn.
(Storrs)

Competitive Market-Grade Pricing of Cigar Tobacco Types Suitable for Binder Use. To develop information and analyses for interpreting competitive pricing of identifiable qualities and market-grades of cigar tobacco types suitable for binder use by: (1) establishing the physio-economic characteristics that identify substitutability and define market grades among tobaccos suitable for binder use in export or cigar manufacture; (2) measuring changing price differentials and quality characteristics among identifiable market grades; and (3) relating yearly utilization and production by types to changing market-grades and market-grade price differentials.

Agron., Agr. Econ. ES-320

- Ky. Interrelationships Between Prices of Different Grades of Burley Tobacco. To analyze relationships between prices of different grades of burley tobacco, note trends in these relationships, and if possible, establish 'normal' interrelationships between prices of the various grades.
Agr. Econ. 12
- Ky. Demand Interrelationships Between Burley and Selected Other Types of Tobacco. To (1) define and qualify, insofar as possible, the factors influencing the demand for burley, flue-cured and Maryland tobaccos; (2) derive statistical demand curves for each of above types of tobacco; (3) define types of interrelationships existing between demands for burley, flue-cured and Maryland types; and (4) analyze and evaluate agricultural policy implications of results obtained.
Agr. Econ. 19
- Ky. The Market Potential for U. S. Tobaccos in Spain. To (1) analyze market potential for U. S. tobaccos in Spain; and (2) appraise courses of action most likely to bring about increased exports of U. S. tobaccos to Spain.
Agr. Econ. 23
- Ky. Factors Affecting the Dispersion in Prices of Tobacco of the Same Grade at Auction Markets. To determine the effect of various factors upon the price of individual baskets of tobacco of like grade and to discover ways of reducing undue variation in price from one similar quality basket to another. Such factors for study will include: (1) intensity of light on tobacco when sold; (2) speed of sales; (3) physical and mental alertness of participants in sale; (4) number of persons participating in the auction; (5) distribution of purchasers buying directly for tobacco companies, on order for tobacco companies, for speculation and the like; and (6) other factors that relate to sale price which may be discovered as the project develops.
Agr. Econ. 24
- Okla. Marketing Broomcorn in Oklahoma. To learn (1) effects of aggregate production, marketing practices, and cultural practices on prices received by state growers for their broomcorn; and (2) requirements in terms of market stability and market prices for a stable or growing broomcorn industry in Oklahoma.
Agr. Econ. 937
- Tenn. The Market Potential for U. S. Tobaccos in Italy. To provide information on nature and extent of potential market for U. S. leaf in Italy.
Agr. Econ., Rur. Soc. 153

Maintaining and Improving Quality

- Ga. Study of the Marketing Quality of Pecans and Pecan Products.
To learn (1) influence of conditions in orchard on marketing quality of pecans; (2) influence of methods of shelling pecans on quality of pecan products; (3) effect of chemical composition of pecans on stability of pecans and pecan products and effect of adding antioxidants, hydrogenated fats, lecithin, etc.; and (4) influence of methods of packaging shelled and unshelled pecans on stability of pecan products.
Hort. 77
- Md. Production, Harvesting, Curing and Storing of Maryland Tobacco.
D, Tobacco Housing. To (1) determine optimum conditions of temperature, humidity and air movement for the curing and storing of tobacco; (2) determine the extent to which it is economically justifiable to achieve these conditions; and (3) design and develop equipment and methods to maintain these conditions as uniformly as possible in all parts of full-size barns.
Agr. Engin., Agron. R-11-D
- Costs, Margins, and Efficiency of Operations
- Ga. Costs and Innovations in Marketing Flue Cured Tobacco. To (1) determine cost of marketing flue cured tobacco; (2) evaluate technological innovations which might lower costs and contribute to a more serviceable market facility; and (3) ascertain needed adjustments in length of marketing season and other customs and habits in the marketing arrangement.
Agr. Econ., Agron. ES-337
- Ky. Efficiency of Labor and Equipment in Handling Tobacco on Loose-Leaf Warehouse Floors. To discover ways of saving labor in the physical handling of tobacco received, sold, and loaded out by loose-leaf tobacco warehouses. More specifically; (1) to develop ways of organizing the crew for more efficient operation; (2) to devise mechanical equipment which may simplify or speed up the work; and (3) to discover the amount and arrangement of unloading space, of scales, of sales space, etc. which seems most effective in handling tobacco for sale for auction.
Agr. Econ. 25
- Ky. Organization and Operation of Tobacco Auction Warehouses. To (1) learn ownership and management patterns and capital requirements of different-sized warehouses; (2) measure relationships between warehouse capacity and volume of sales occurring from, time to time, market to market, and warehouse to warehouse; (3) learn relation of volume to financial returns; and (4) seek optimum input-output combinations of labor, equipment, floor space and arrangement, and capital investment with volume.
Agr. Econ. 33

P. R. Marketing of Sugar in Puerto Rico. To determine (1) nature and importance of various items of expense incurred in marketing sugar; and (2) influence of certain factors of organization and operation upon efficiency of sugar marketing.

Agr. Econ., Soc. 75

Transportation, Location, and Interregional Competition

Nev. The Economics of Marketing Hay and Feed in the West. To describe and analyze economic phases of transportation and trading in feed grains and hay in the West.

Agr. Econ. 1 (WM-20)

Cooperatives

Ky. Cooperative Marketing of Tobacco in Kentucky. To study the factors affecting the success and failure of tobacco pools in Kentucky.

Agr. Econ. 17

Government Programs

Ky. Effects of the Price Support, Acreage Adjustment and Surplus Removal Programs in Dark Tobacco Upon Kentucky's Agriculture. To (1) measure and appraise effects of Federal price support, acreage adjustment, and surplus removal programs upon supply, domestic and foreign consumption, markets and prices, and gross incomes for dark tobacco, particularly as these aspects pertain to Kentucky's agriculture; (2) measure and appraise effects of program for dark tobacco in terms of concurrent changes in farm enterprise combinations, marketing system, and interrelationships among product and factor prices for dark tobacco; and (3) study interconnections of federal program for dark tobacco with programs for other farm commodities important in Kentucky's agriculture, and to examine interaction of effects of such programs.

Agr. Econ. 37 (SM-14)

N. C. The Federal Peanut Programs and Their Effects on Peanut Farming and Marketing. To (1) measure and appraise effects of federal price support, production adjustments and surplus removal programs on supply, consumption, markets and prices of peanuts, with emphasis on competition between type of peanuts grown in N. C. and Va., and types grown in other sections of the South; (2) measure and appraise effects of programs on income from peanut farming, allocation of resources within, and between, farms, and interrelationships of product and factor prices in peanut growing regions; (3) study interconnections of peanut programs with programs for cotton and tobacco, and examine interaction of effects of such programs at farm level; and (4) make available to farmers and general public, pertinent information on peanut program.

Agr. Econ. HM-2 (SM-14)

P. R. Effects of the Quota System, Surplus Allocation, and Price Control With Governmental Subsidy and Incentive Payments Upon the Sugar Industry and the Economy of Puerto Rico. To measure and appraise (1) effects of quota system, surplus allocation and price control with governmental subside and incentive payments upon supply, consumption, price, and gross income for sugar; (2) effects of sugar program in terms of concurrent changes in farm enterprise combinations, market systems, and interrelations of product and factor prices for sugar; and (3) impact of policies on the economy at large.

Econ., Rur. Soc. 84 (SM-14)

P. R. Effects of Federal and Commonwealth Programs Upon the Tobacco Industry and the Economy of Puerto Rico. To (1) measure and appraise effects of Federal and Commonwealth programs upon (a) supply, consumption, price, and gross income for tobacco, and (b) concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices for tobacco; and (2) study interconnections of these programs for tobacco with programs for other farm commodities important in Puerto Rican agriculture and examine interaction of their effect.

EC, Rur. Soc. 85 (SM-14)

Va. Effects of the Price Support, Acreage Adjustment, and Surplus Removal Programs in Peanuts Upon the Price Relationships Between Peanuts and Various Competing Products. To (1) measure extent to which end-users have modified their purchase and use of peanuts due to varying price relationships; and (2) measure demand and price, income and cross-elasticities of peanuts and peanut products at end-use levels.

Agr. Econ. 8448 (SM-14)

Miscellaneous

P. R. Study of the Marketing, Distribution and Consumer Preferences for Brands of Puerto Rican Rums in the Local Market. To determine (1) importance of rum industry for 'colonos' and sugarcane mills; (2) historical trend of sales in local market of different brands of rums made by rum concerns in the Island; (3) marketing channels in chain of distribution for brands of Puerto Rican rums in the local market; (4) price spreads of brands of rums between manufacturers and consumers in the local market and the factors influencing the magnitude of price mark-ups at different stages of distribution; (5) influence of different factors such as quality, age, color, flavor, aroma, price, income, sales promotion policies, etc., on consumer preference for Puerto Rican brands of rums in the local market; (6) competitive position of Puerto Rican brands of rums relative to Cuban and other imported rums and hard liquors sold in the local market; (7) study the history of federal and insular tax policies with respect to hard liquors and beers; and (8) determine sales promotion policies and methods utilized to push the sale of brands of Puerto Rican rums in the local markets

Agr. Econ. 45

REGIONAL PROJECTS

SM-14

Effects of Price Support, Acreage Adjustment and Surplus Removal Programs Upon Southern Agriculture. The objectives of the project are: (1) to measure and appraise the effects of Federal and State* price support, agricultural adjustment and surplus removal programs upon the supply, domestic and foreign consumption, markets and prices, and gross incomes for farm products important in southern agriculture; (2) to measure and appraise these effects in terms of the concurrent changes in farm enterprise combinations, market systems, and interrelationships of product and factor prices; (3) to study the interconnection of the programs, and the interaction of their effects.

* Included to cover Puerto Rican programs in tobacco which have state controls over acreage.

Contributing State Projects:

Ky., 37, Effects of the Price Support, Acreage Adjustment and Surplus Removal Programs in Dark Tobacco Upon Kentucky's Agriculture. (page 30)

N. C., HM-2, The Federal Peanut Programs and Their Effects on Peanut Farming and Marketing. (page 30)

P. R., 84, Effects of the Quota System, Surplus Allocation, and Price Control with Governmental Subsidy and Incentive Payments Upon The Sugar Industry and the Economy of Puerto Rico. (page 31)

P. R., 85, Effects of Federal and Commonwealth Programs Upon the Tobacco Industry and the Economy of Puerto Rico. (page 31)

Va., 8448, Effects of the Price Support, Acreage Adjustments, and Surplus Removal Programs in Peanuts Upon the Price Relationships Between Peanuts and Various Competing Products. (page 31)

The Economics of Marketing Hay and Feed in the West. To (1) describe the movement of hay and feed concentrates between the Western Region and the rest of the United States and between States in the Western Region with particular emphasis on determining areas of origin and destination and a description of the channels through which the movement takes place; (2) describe the marketing methods and mechanisms by which the interstate movement of hay and of feed grains, particularly corn and barley, is effected within the Western Region; (3) describe the role of the commercial feed mixers in the interstate movement of feed concentrates in the Western Region; (4) analyze the functions performed by the market mechanism in the interstate movement of hay and of feed grains, particularly corn and barley, in the Western Region, in order to determine the costs and margins incurred in the market system for the movement of such hay and feed grains, and to determine the reasonableness of such costs and margins in the light of the services rendered; and (5) analyze the services rendered by the market and processing mechanisms for the interstate movement of feed concentrates, particularly in the commercial feed-mixing industry, in order to determine the costs and margins incurred in such interstate movement of feed concentrates, and to determine the reasonableness of the charges levied in the light of such services rendered.

Contributing State Projects:

- Ariz., 415, The Economics of Marketing Hay and Feed Grains in Arizona. (page 25)
Mont., 122, A Description and Analysis of the Market Mechanism for the Movement of Important Feed Grains. (page 25)
Nev., 1, The Economics of Marketing Hay and Feed in the West. (page 30)
N. Mex., 30, The Economics of Marketing Alfalfa Hay and Grain Sorghums in New Mexico. (page 26)
Wyo., 616, The Economics of Marketing Hay and Feed in Wyoming. (page 27)

LIST OF SUMMARIES OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

SESD-OD-1103 :		
Summary	Subject-Matter Area	Title of Summary
Number		
1	Agricultural Chemistry <u>2</u> /	Agricultural Chemistry
2	Agricultural Economics <u>2</u> /	a. Prices & Incomes & General Studies of Commodities or Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering <u>1</u> /	a. Land & Water Use & Development b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Industry <u>1</u> /	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry <u>1</u> /	Dairy Cattle
6	Dairy Technology <u>1</u> /	Dairy Technology
7	Entomology & Economic Zoology <u>1</u> /	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops <u>1</u> /	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology <u>1</u> /	Food Science & Technology (Secs. a, b and c)
10	Forage Crops, Pastures & Ranges <u>1</u> /	Forage Crops, Pastures & Ranges
11	Forestry <u>1</u> /	Forestry
12	Fruits & Nuts <u>2</u> /	Fruits & Nuts
13	Home Economics	<u>1</u> / a. Human Nutrition <u>1</u> / b. Housing <u>2</u> / c. Foods <u>2</u> / d. Household Economics & Equipment

1/ Summary Available

2/ Summary will be available by February 1, 1957

SESD-OD-1103 Summary Number	:	Subject Matter Area	:	Title of Summary
14		Economics of Marketing <u>2/</u>		a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15		Meteorology <u>1/</u>		Meteorology
16		Ornamental & Drug Plants <u>2/</u>		Ornamental & Drug Plants
17		Plant Pathology & Bacteriology <u>1/</u>		a. Plant Pathology & Botany b. Diseases of Field Crops c. Diseases of Fruit Crops
13		Plant Physiology & Nutrition <u>1/</u>		Plant Physiology & Nutrition
19		Poultry Industry <u>2/</u>		Poultry Industry
20		Rural Sociology <u>1/</u>		Rural Life Studies
21		Soils & Fertilizers <u>1/</u>		Soils & Fertilizers
22		Vegetables <u>1/</u>		a. Vegetable Crops b. Potatoes
23		Veterinary Science <u>1/</u>		Veterinary Science
24		Weeds <u>1/</u>		Weed Control

1/ Summary Available

2/ Summary will be available by February 1, 1957

FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

SEPTEMBER 1956

ECONOMICS OF MARKETING

Section g: Cross Commodity and Functional Studies

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Prepared primarily for the use of workers in agricultural
research in the subject-matter areas presented.

✓✓ Compiled in the
State Experiment Stations Division
✓ Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

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FOREWORD

This compilation is one of a series providing information on agricultural research at the State Agricultural Experiment Stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State Agricultural Experiment Stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project (if several States are working cooperatively). Most of the regional and a number of individual State projects involve cooperation with various agencies of the United States Department of Agriculture. For cooperative projects between the United States Department of Agriculture and State stations, consult the summary of research projects reported by the Central Project Office. Because of diverse interest and in order to provide appropriate reference, certain projects are listed in more than one subject field.

The relevant regional projects and the titles of the contributing State projects, appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC- North Central, NE- Northeastern, S- Southern and W- Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

Marketing projects are classified on the basis of commodities and of marketing functions. The commodities are presented in seven sections. The other sections and the commodities are as follows:

- Section a - Field Crops
- " b - Fruits and Vegetables
- " c - Livestock, Meats, and Wool
- " d - Dairy Products
- " e - Poultry and Poultry Products
- " f - Forest Products, and Ornamental and Drug Plants

In each Section the projects are grouped according to functions in the marketing process, as indicated in the "Contents." Kinds of studies under each function are indicated below. This should prove helpful in understanding the segments of the marketing process covered by present projects and the relative emphasis being given to each segment.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

MAJOR MARKETING FUNCTIONS AND TYPE OF STUDIES INCLUDED UNDER EACH

1. Market Structure and Practices
Marketing channels; organization of markets; operating policies and buying and selling practices in handling, storing, and distribution; availability and needs for facilities and services at various stages in the marketing process; competitive structure of markets; integration in the marketing process; impacts of technological changes.
2. Demand, Consumption, and Prices
Elasticities of demand; demand schedules and changes in aggregate consumer demands; consumption trends; competitive position of different products; prices at different market levels--farm, wholesale, and retail--and their relationships; product utilization patterns; pricing policies; quality premiums and discounts; how prices are determined.
3. Consumer Preference and Merchandising
Forms and amounts of family purchases; methods of processing and preparation for acceptability; consumer preference and buying behavior; motivations underlying consumer practices in buying; product promotion and buying practices; measuring potential demand for new and improved products or services; product development and market testing.
4. Grades, Standards, and Inspection
Identification and measurement of quality; formulation of grade standards; development and improvement of quality testing and measuring techniques and procedures.
5. Market Information
Developing outlook and situation reports and forecasts; methods of improving statistical reports and news service releases on market receipts and movements, prices, stocks; ways of disseminating market information; kinds of market information needed and forms in which it is most useful; ability to use market information; methods of obtaining information; accuracy of information.
6. Maintaining and Improving Quality
Economic aspects of measures to preserve and control quality and avoid losses of quality of products; facilities for proper storage; grading and quality improvement programs.
7. Costs, Margins, and Efficiency of Operations
Mark-ups, spreads, and discounts; the composition of margins; operating costs and returns and their measurement; input-output relationships and economies of scale; design and operation of facilities and equipment; work methods and organization; factors affecting efficiency.
8. Transportation, Location, and Interregional Competition
Transportation rates and charges; effect of rate structure and movement of products; truck versus rail movement of products; transportation costs as related to price and production patterns; influence of transportation cost upon scale of operation of processing plants; interstate trade barriers.

9. Cooperatives

Services rendered and charges made; efficiency of operations; membership relationships; methods of financing; internal management policies and practices; function and place in the marketing system.

10. Government Programs

Public regulation of markets, product quality, and trading practices; impacts of parity formulas, price supports, surplus removals, and storage, consumption and diversion programs, etc., on particular commodities and groups of commodities and the agricultural economy in general.

11. Miscellaneous

- Ind. Pricing and Marketing of Fertilizer in Indiana. To learn (1) pricing and marketing patterns for fertilizer materials, with emphasis on prices for newer types of material; (2) extent to which price differentials for comparable fertilizer materials reflect cost of tie-in services and/or credit; (3) knowledge by farmers of physical characteristics of available materials; and (4) existence of discriminatory prices and sales policies by fertilizer manufacturers and/or distributors.
Agr. Econ., Agron. 847
- Ky. Problems in the Marketing of Farm Perishables. To (1) appraise impacts of changing market structures on local and nearby markets for farm perishables; and (2) determine what growers must do, what products can compete most effectively for the nearby markets, and under what conditions it is economically sound to encourage the maintaining or expanding of local production.
Agr. Econ. ES 252
- Miss. Marketing Tung Nuts and Oil Seed Crops. To (1) describe existing marketing facilities services and practices for tung nuts, soybeans, and cottonseed; (2) determine effect of changing supplies of these commodities on marketing facilities, services and practices; (3) determine pattern of use and estimate demand for these commodities; (4) determine effect of changing relative prices, including price support programs, for these commodities on supply, storage and use; and (5) project probable needs for marketing facilities, services, and practices.
Agr. Econ. HA-12
- S. C. Retail and Wholesale Marketing Methods for Agricultural Products. To (1) find retail and wholesale marketing methods that are used in South Carolina for agricultural products under varying conditions as to: size of business, organizational structure, services performed, commodities handled, and competitive conditions; and (2) evaluate such retail and wholesale marketing methods with respect to: prices paid by consumers, quantities bought by consumers, quality maintenance, shrinkage and spoilage, and direct and indirect costs.
Agr. Econ. and Rur. Sociol. 74.

Demand, Consumption, and Prices

- Calif.
(Berkeley) Statistical Analysis of Demand for California Agricultural Products. To (1) discover, measure, and statistically analyse demand for California farm products; (2) statistically determine elasticities of demand with respect to prices and income; (3) measure changes and shifts over time in demands for California farm production; and (4) develop economic and statistical explanations of changes in demand.
Agr. Econ. 1448
- Ga. Analysis of the Supply, Price, and Utilization of the Principal Crop, and Livestock Products in Georgia. To analyze economic significance of major changes in quantity, value, and use of principal agricultural products of the state.
Agr. Econ. M-12

- Ga. Determination of Changes in Demand and Consumption Patterns for Food Products. To (1) learn changes in types and quantities of food purchased and expenditures for food effected by changes in household income, household composition, and prices or price ratios; (2) differences in types and quantities of foods purchased by households having varying incomes and composition, (3) evaluate effects of promotional campaigns on consumption of advertised products and their substitutes; (4) effects of changes in forms and types on demand for foods affected; and (5) provide basic data for determining changes in food habits and subsequent effect on nutrition.
Agr. Econ. M-19
- Kans. Basic Economic Conditions Influencing the General Level of Market Prices for Kansas Farm Products. To identify and measure influence of basic economic factors associated with changes in general level of prices of farm products and relationships among broad groups of prices.
Agr. Econ. 364
- Mich. Reducing Instability of Market Prices for Michigan Farm Products. To analyze alternative methods by which farm income might be stabilized, impacts on agricultural markets and marketing, effects of such methods in Michigan on size of farm income, its variability and distribution, efficiency of farm operation, and other criteria important to farm people and to the economy.
Agr. Econ. ES 116
- Mich. Analysis of Actual Changes in Food Patterns as Family Incomes Vary. To (1) compare family purchases of food groups in the Michigan State University Consumer Panel before and after changes in income, with adjustments for changes in family composition; and (2) compare such differences with those found between income groups in a cross-section of the panel during one period of time.
Agr. Econ. 843 (IRM-1)
- Minn. Food Consumption and New Markets. To (1) measure relationships existing between food consumption and various variables; (2) measure and evaluate possible new markets for food domestically and abroad, and consider and evaluate programs for reaching these markets; and (3) consider and evaluate non-food uses or markets for agricultural commodities.
Agr. Econ. 1119
- Minn. An Economic Analysis of Demand Expansion Policies and Programs for Food in the United States. To (1) learn food consumption potential where limiting factor income is lifted; a shift in tastes and preferences to higher-resource-using foods occurs and established nutritional needs are fully satisfied; (2) describe and appraise effectiveness of different programs and methods for achieving potentials ascertained under (1) above; and (3) describe consequences of achieving food consumption potentials under different criteria in terms of quantities taken, aggregate level of farm prices and income, distribution of farm incomes among areas and commodity groups, and consumer well-being.
Agr. Econ. 1129 (IRM-1)

Miss.

The Influence of Locker Plants and Home Freezers on the Consumption and Market Outlets for Locally-Produced Farm Products. To learn (1) kinds, sources, amounts and costs of foods stored in community and home freezers, kinds of marketing services used and wanted and methods of supplying services more efficiently; and (3) evaluate value of frozen foods as to money costs, time-saving, and diet improvements.

Home Econ. and Agr. Econ. ES 460

Ohio

Elasticity of Demand for Farm Products Important to Ohio Agriculture. To (1) measure elasticity of demand for products important to Ohio agriculture and for those competing with Ohio; (2) find at what price or price levels substitution is made for different products and what substitution is made; and (3) by determining what the demand for products grown by Ohio farmers is at different price levels to thereby provide a guide to desirable agricultural production.

Agr. Econ. and Rur. Sociol. 52

Okla.

Consumer Demand for Eggs, Dressed Chickens and Beef as Measured by Price and Quality. To (1) determine preference of consumers for different quality characteristics of beef, eggs and dressed chickens; (2) estimate monetary values consumers place on preferences for quality characteristics of beef, eggs, and dressed chickens; and (3) show how method of selling said produce reflects consumer preferences to producer.

Poul., Agr. Econ. ES 457

P. R.

Market Potentials for Puerto Rico Agricultural Products. To (1) estimate the relative magnitudes of demand by 1960 and 1965 in both local and export markets for agricultural products suitable for Puerto Rico; and (2) learn conditions to be met if these potentials are to be realized.

Agr. Econ. 90

Consumer Preference and Merchandising

Conn.
(Storrs)

Socio-Economic Forces that Influence the Potential Demand for Milk and Eggs by the Older Age Group. To learn cultural and economic forces which would increase use of milk and eggs by the older age group to levels more nearly consistent with nutritional standards by: (1) measuring differences between levels of consumption of milk and eggs and the desirable levels of consumption among individuals and sub-groups within the older age group; (2) identifying social and economic backgrounds and nutritional attitudes within the older age group that are related to differences in consumption of milk and eggs; (3) measuring changes in income, availability of milk and eggs at retail, and attitudes of older people regarding consumption of milk and eggs; and (4) estimating consumption of milk and eggs on the part of older people in 1955, 1960 and 1970 under varying conditions of demand.

Agr. Econ., Home Econ. ES 322

Ky. Family Buying Patterns, Source and Use of Milk and Poultry Products.
To appraise factors within the family that affect the purchasing of milk and poultry items by: (1) determining family buying practices, sources from which families buy, amounts bought, and use made of selected items; and (2) relating characteristic buying patterns to household physical equipment, family habits and customs, sources and use of different milk and poultry items, and kinds and sources of information relevant to food buying.

Agr. Econ. and Home Econ. 1009 (SM-13)

Mich. Nutritive Value of Food Purchased by a Sample of Lansing Families During a Five Year Period. To (1) study food purchase records of families collected by Department of Agricultural Economics and to assess nutritive quality of diets; (2) analyze buying practices from standpoint of contributions to improvement or degradation of the nutrition of Michigan families; and (3) evaluate ability of homemakers to select nutritionally adequate diets under varying socio-economic conditions.

Home Econ. and Agr. Econ. 817

Miss. Changes in Family Food Purchases and Use Practices Following Gainful Employment of the Wife. Study changes in foods used, type of menus and nutritive value of food when homemaker works.

Home Econ. and Agr. Econ. HJ-3

N. H. Economic Effects of Changes in Retail Food Marketing Services.
To (1) identify and classify consumer services at the retail food store level; (2) determine the costs of providing alternative types and quantities of consumer services including packaging of fresh produce and meat, store, facilities (aisle width, check-out speed, parking facilities, display area) and variety of items; and (3) determine the relationship existing between types and quantities of these consumer services offered at the retail level, and (a) volume of sales and (b) consumer income levels in order to estimate the consumer demand for services.

Agr. Econ. 109 (NEM-17)

N. Y.
(Cornell) Evaluation of Experimental Designs Used in the Development of Improved Merchandising Practices for Selected Food Products. To evaluate and test experimental designs offering promise as more efficient alternatives in development and measurement of improved merchandising practices applied to food products of differing demand characteristics.

Agr. Econ. 29

Oreg. Comparison of Small Preference Panels with a Household Consumer Panel. To compare (1) "expert" panels of 10 to 20 members; (2) student panels of 100 to 150 members; and (3) household consumer panel of 200 city families in western Oregon for their preferences on 12 Oregon food products. To evaluate the effectiveness of the first two panels in estimating the preferences of the consumer panel.

Food Tech. and Agr. Econ. 253

Pa. Increasing Demand for Agricultural Products by Improving Food Consumption Practices. To (1) learn effect of various characteristics as nationality, education, occupation, religion, and related social factors on food habits, and attitudes resulting in a variation in consumption; and (2) develop and test educational program to increase consumption levels.

Agr. Econ and Rur. Sociol. ES 466

Pa. Merchandising Agricultural Products-B. Measurement of Consumer Responses to Retail Food Merchandising Practices. To test effect of retail food merchandising practices on returns to retailers, other trade agencies, and producers.

Agr. Econ. and Rur. Sociol. 1172-B

W. Va. Economics of Packaging Selected Foods. To (1) determine the costs and values of certain alternative methods of packaging selected food products; (2) relate packaging to methods and itemized costs of handling and to market structure, giving special emphasis to directness of marketing; and (3) determine effects of types of packaging on retail sales volume, for the individual firm by type of firm and for the industry.

Agr. Econ. and Rur. Sociol. 98 (NEM-17)

Grades, Standards, and Inspection

Mich. The Development of Improved Consumer Grades for Agricultural Products. To determine factors used by consumers in identifying product quality and ways by which the factors can be incorporated into practical consumer grades and thereby improve the function of grades in the marketing system.

Agr. Econ. ES 291

Market Information

Alaska Crop, Livestock and Related Market Statistics. To (1) collect a time-series of basic agricultural statistics needed in conducting marketing studies on changes in supply of and demand for local farm products; (2) collect prices received for local products and paid for production supplies; (3) develop outlook information on prospective yields, production, and demand as a guide to future marketing problems; and (4) collect and disseminate a price series of food items in major Alaskan cities and use in comparing price relationships between cities and for comparing spreads between producers and retailers and for allied purposes.

Agr. Econ. 37 (M)

Mich. Use of Mass Media as Sources of Market Information by Part-Time and Full-Time Farmers - A Comparative Analysis. To compare the use of market news information by part-time and full-time farmers as to: (1) availability and response to information through mass media; (2) organization of production program including use of farming practices; (3) relation of producers to dealers; (4) relation of producers to neighborhood and community; and (5) orientation to farming: attitudes and goals of farming as an occupation.

Sociol. 69

Nev. Improving Current Market and Market Outlook Reports. To learn (1) market information and market outlook needs of state farmers and ranchers; (2) current sources of information on market outlook and current market conditions; (3) uses made of available materials; (4) adequacy of content, presentation, and uses made of available materials; and (5) means of incorporating research findings into improved market information and outlook reports.

Agr. Econ. 38

N. Dak.

Analysis of Price and Marketing Statistics for North Dakota.

(1) The analysis of price, marketing and income data to indicate price-supply, market-price, quality-price and other important marketing relationships for North Dakota Agriculture and (2) to make available through published reports, up-to-date price and marketing statistics which will assist farmers and marketing agencies in improving their operations.

Agr. Econ. 3-9M

Costs, Margins, and Efficiency of Operations

Ala.

Development and Refinement of Processes for Improving the Market Quality of Selected Products from Horticultural Crops. To (1) develop and refine processes for improving market qualities of selected products from horticultural crops and adapt these processes to commercial use; and (2) determine indicated yields and approximate costs of finished products from different commercial grades of fresh material when processed by different methods.

Hort. and Agr. Econ. 549

Idaho

Case Studies of the Impact of Technology in the Marketing of Dairy Products and Potatoes. To (1) learn new technologies being introduced in marketing of said products; (2) study cases of new technologies in detail so as to learn their adaptability to Idaho plants and to assess effects upon processing costs and industry organization and (3) test adequacy of currently used methodologies in appraising effect of innovations and to develop more adequate ones.

Agr. Econ., Dairy Indus. and Hort. 292 (WM-25)

Ind.

Financial Analysis of Independent Retail Food Stores in Indiana. To (1) formulate statistical standards from operating records useful for store managers' evaluations; and (2) learn influence of various factors including common management policies and practices on operating results of different sizes and types of food stores.

Agr. Econ. 810

Kans.

Economics of Scale in Marketing and Processing Plants. To (1) learn economies associated with various resource combinations at a number of scales of operation, under specified levels of technology; (2) estimate coefficients of returns to scale and appraise implications of these findings on contraction or expansion of size to number of marketing firms in the Midwest; and (3) estimate physical production functions in order to appraise more accurately the impact of public and private policies that affect the prices of factors and products of these firms.

Agr. Econ. 467

Maine

Changes in Marketing Costs in Providing Consumers' Services. To (1) learn costs of labor, materials, and facilities of alternative methods of packaging and product form of specific agricultural products; and (2) appraise alternative methods of packaging and product form on volume of retail sales and consumer acceptance.

Agr. Econ. 87 (NEM-17)

Mass.

Changes in Marketing Costs Associated with Curtailment or Expansion in Consumer Services. Learn amount and incidence of physical and monetary costs associated with introduction, expansion, curtailment or other modification of personal service as a marketing function so to: (1) measure effects of changes in consumer services on marketing margins and volumes of sale; (2) learn amounts of manpower, marketing equipment and marketing supplies used to provide particular consumer services; (3) estimate impairments or improvements in nutritional elements of perishable food products associated with changes in services; (4) estimate changes in direct marketing costs borne by consumers that would accompany changes in consumer services rendered by marketing organizations; and (5) provide consumers with basis for estimating relative values.

Agr. Econ. 131 (NEM-17)

Mich.

Increasing Efficiency of Operations in Retail Food Stores. To (1) develop better methods of organizing facilities and using labor and equipment so as to increase productivity and lower costs of retailing operations; (2) adapt improved methods to stores of different types and sizes; and (3) measure changes in efficiency resulting from adoption of improved methods of operation.

Agr. Econ. 114

Ohio

Factors Affecting Operating Costs, Service Charges and Margins of Country Elevators in Ohio. To (1) learn effect of volume of various types of business on net income of elevators; (2) learn impact of specific commodities and classes of commodities on business management decisions at elevators; (3) analyze and establish measures for effect of size and location on income and expense relationships of elevators; (4) analyze and establish ratios of operations of individual cost items to net income and investment for elevators; (5) learn relationships between service charges and margins for various commodities and net returns to operations of elevators; and (6) establish a financial structure for a model elevator for various locations.

Agr. Econ., and Rur. Sociol. 158

S. C.

Economic Problems in Processing Agricultural Products. To (1) determine for specific agricultural products the adequacy of existing processing facilities in terms of size, location, equipment, methods of operation, services, etc.; (2) evaluate selected types of processing plants in terms of their effects on area of supply, stability of demand for particular products, etc.; and (3) measure plant efficiency in terms of input-output relationships.

Agr. Econ. and Rur. Sociol. 75

Wash.

Case Studies of Economic Effects of New Technologies in Fruit and Dairy Marketing in Washington. To (1) inventory for dairy and fruit industries technological developments known but not adopted; (2) analyze economic conditions affecting adoption of same; and (3) analyze economic effects of adoption of same.

Agr. Econ., Agr. Engin. and Dairy Sci. 1309 (WM-25)

Cooperatives

- Ark. The Decision Making Process in Farmers' Cooperative Organization.
To analyze decision making process in farmers' cooperative organizations as influenced by type and size of organization, various role definitions, role conflicts, referents and reference groups of the decision-maker.
Rur. Econ. and Sociol. 379
- Calif.
(Berkeley)
(Davis) Analysis of Cooperative Marketing Activities in California. To
(1) trace history of major cooperative marketing associations in state.
(2) analyze accumulated experience of associations in terms of problems faced, degree of success attained, and reasons for success or failure; and (3) provide an improved basis on which state farmers may use agricultural cooperative associations as effective tools for solution of marketing, processing, and distribution problems.
Agr. Econ. 1708
- Hawaii An Economic Evaluation of Agricultural Cooperatives in Hawaii.
To (1) examine development of farmer cooperatives in Territory, including reasons for heavy mortality rate; (2) report present status of cooperative marketing and purchasing associations in Hawaii; (3) review critically the operating policies and practices of existing farmer cooperatives; and (4) consider the needs of existing associations and the prospects of further development of cooperative to serve Hawaii's farmers.
Agr. Econ. 364
- Kans. Organization and Operation of Farmers' Cooperative Marketing and Purchasing Associations. To (1) develop adequate factual information for members of cooperatives and agricultural leaders, concerning sound principles of organization and operation of farmer-owned business associations for the purpose of facilitating the efficient marketing of farm commodities and the purchasing of farm supplies; and (2) provide factual information as a basis for sound public policy in regard to cooperatives.
Agr. Econ. 324
- Ky. Organization and Operation of Farmer Cooperatives in Kentucky.
To accomplish a detailed census of cooperatives, including comprehensive and current information on: age, growth, membership, services rendered, financial and organizational structure, nature and extent of competition faced, membership contacts, programs, problems, public relations activities, informational programs conducted, extent of educational work with young farmer groups, community relationships, directorate arrangements, relations with agricultural agencies, with competitors, and with other cooperatives, legal and tax status, and other relevant information affecting successful operation of such cooperatives.
Agr. Econ. 36
- Md. Analysis of the Development of Farmer Cooperatives. To (1) determine current status of farmer cooperatives as to number, volume of business and membership; (2) analyze development of cooperatives since 1940 and evaluate reasons for progress made and causes of failure during the period; and (3) analyze financial structure of cooperatives by using various accepted financial ratios as standards of measure.
Agr. Econ. A-26-al

Minn. Business Analysis of Farmers' Marketing and Purchasing Associations. To obtain information from representative cooperative organizations including operating costs; amounts, methods, and sources of financing; business management policies and related aspects to serve as guides for other organizations and to point the way to improvements in methods.
Agr. Econ. 1117

Mo.. Cooperative Marketing in Missouri. To ascertain (1) use of co-operatives by farmers; (2) services performed by cooperatives; and (3) financing of local cooperatives.
Agr. Econ. 254

Ohio Improving the Financial Management of Agricultural Marketing Agencies. To (1) learn methods now in operation of financing Agricultural Marketing and Farm Supply Cooperatives; explore (2) adequacy of financing methods with respect to needs for successful business operations and costs of such methods; (3) various forms of cooperative securities and evidences of Equity by patrons used by present day cooperatives; (4) study negotiability of cooperative securities and possibilities of a market for such securities; (5) learn relation between investment in cooperative Securities and participation by patrons and members; (6) ascertain if misunderstanding of coop financing and its problems may be limiting factors in the proper furnishing of adequate capital; (7) learn amount and methods used in extending short term credit to patrons through open accounts; and (8) appraise over-all financing situation facing cooperatives considering legal requirements, Internal Revenue rulings and marketing jobs that have to be done by cooperatives.
Agr. Econ. and Rur. Sociol. 159

Okla. Cooperative Elevator Management. To learn ways cooperative elevators can be improved by changing management structure and operation so that they can make greater returns to farmers.
Agr. Econ. 906

P. R. A Study of the Social Aspects of Cooperative Associations. To study organization, membership, and other social aspects of cooperatives in Puerto Rico and the effect of these associations on the people and communities they serve.
Agr. Econ. 28

Tenn. Financial Management and Related Problems Affecting the Success of Tennessee Cooperatives. To (1) identify primary factors affecting financial success of Tennessee Cooperative Associations; (2) evaluate the effect of various financial management arrangements on capital availability and efficiency of cooperatives; (3) analyze the importance of related factors in determining the degree of success of various financial arrangements; and (4) appraise the effects of particular public policies and regulations affecting financing and related management problems of cooperatives.
Agr. Econ. and Rur. Sociol. 19

Government Programs

- W. Va. Effects of National Production Control and Price Support Programs on Incomes of Farmers in the Appalachian Area. Study combined and interacting effects of national price and income policies for individual agricultural commodities on incomes of farmers in Appalachian area: (1) assemble data on farm resources and organization needed for analysis of government agricultural price and income programs; (2) evaluate effects of particular price support, income support, and production control programs on incomes and operating efficiency of important types of area farms; (3) evaluate effects of national agricultural price and income programs on inter-regional competitive position of agriculture; and (4) study effects of such programs on small farms not primarily engaged in production of "basic" commodities.
Agr. Econ. and Rur. Sociol. 100 (IRM-1)

Miscellaneous

- Fla. An Economic Analysis of the Florida Honey Industry. To make analysis in respect to: (1) market flow over time; (2) market place distribution; and (3) costs and factors affecting costs of packing honey.
Agr. Econ. 791
- Ill. Effects of Selected Practices on Costs of and Efficiency in Distributing Commercial Feed. To discover (1) more efficient ways of distributing commercial feed by determining conditions under which users of feeds secure feed advisory, delivery, and credit services from different sources; and (2) and secure cooperation of selected feed retailers following different policies as to services indicated above.
Agr. Econ. 05-353
- Ind. Effects of Indiana Trade Association Activities on the Marketing of Farm Products and Farm Supplies in Indiana. To (1) determine the extent that trade association activities influence marketing channels, procedures and practices for buying and selling farm products and farm supplies in Indiana; (2) analyze and evaluate the effects of trade association activities on a specific industry organization or a selected phase of agricultural marketing; and (3) recommend ways in which trade associations can contribute more effectively and other groups can better utilize the services of trade associations to improve agricultural marketing.
Agr. Econ. 875
- Miss. Factors Affecting the Use of Marketing Facilities by Farmers. To determine (1) marketing services and facilities which are available to farmers; (2) extent to which these services and facilities are being used, and changes which have occurred in use over time; (3) why present services and facilities are not being used or are being used improperly; and (4) ways to improve present marketing services and facilities in order that they will be of greater benefit to farmers.
Agr. Econ. HA-9

- Miss. A Study of the Important Economic Factors Involved in the Marketing of Farm Products to Meet the Changes Resulting from Industrialization. Study changes in the marketing structure for specified farm products, accompanying industrial development of a market center including changes in: wholesale and retail market organization; relative position of locally produced food products from outside the area; resource use, enterprise combination, and scale of operation on farms within area affected by industrial expansion; degree of industrial expansion, as measured by employment in manufacturing industries.
Agr. Econ. HA-16
- Okla. Analysis of Financial Records of Agricultural Marketing Organizations of Oklahoma. To (1) secure current information on marketing farm products; (2) develop devices for analyzing marketing institution data which may be used by agricultural marketing agencies; and (3) develop analyses to be used in conferences with marketing agencies.
Agr. Econ. 809
- Okla. Farmers Preferences for Marketing Services. To (1) find preferences which farmers have for different marketing services; and (2) learn attitudes of marketing agencies toward preferences of farmers and their ability and willingness to adjust to them.
Agr. Econ. 879
- S. Dak. Improving the Marketing of Farm Supplies in South Dakota with Special Reference to Farm Machinery. To (1) suggest improvements to increase efficiency of the marketing of farm supplies based on study of the present systems; (2) investigate the role of credit and its availability to farmers wishing to purchase major items of farm machinery; and (3) determine effect of recent oversupply of farm machinery on marketing channels for this machinery.
Agr. Econ. 266
- Tex. Patronage Patterns of Agricultural Producers in the Market. To (1) determine patronage patterns of agricultural producers in local market; (2) ascertain bases for patterns of behavior; and (3) interpret economic significance of patterns in terms of efficient marketing.
Agr. Econ. and Sociol. ES 202
- Va. An Economic Interpretation of the Significance of Changes in Marketing Practices from the Viewpoint of the Producer. To (1) determine impact of changing marketing practices on producers; and (2) make technical and economic evaluation of the feasibility of adopting changes in production indicated in (1) above.
Agr. Econ. 8428
- W. Va. The Marketing of Lime and Fertilizer in West Virginia. To study methods of lime and fertilizer distribution with a view of reducing cost and/or improving service between producer and consumer (farmer).
Agr. Econ. ES 259

REGIONAL PROJECTS

NEM-17

Changes in Marketing Costs Associated with Curtailment or Expansion in Packaging Different Products and in Other Consumer Services. To evaluate alternative methods of providing marketing services such as grading, packaging, labeling, product form, store facilities, store displays and advertising from the standpoint of costs of such services and their effects on consumer satisfaction and level of demand.

Contributing State Projects:

- Maine, 87, Changes in Marketing Costs in Providing Consumers' Services. (Page 7)
- Md., A-26-av, Marketing Margins as Associated with Expansion or Curtailment in Consumer Services.
- Mass., 131, Changes in Marketing Costs Associated with Curtailment or Expansion in Consumer Services. (Page 8)
- N. H., 109, Economic Effects of Changes in Retail Food Marketing Services. (Page 5)
- N. Y. Cornell, 191, Changes in Costs of Marketing Apples Associated with Curtailment or Expansion in Consumer Services. (Part 14, Sec. b, Page 19)
- R. I., M-109, Costs Associated with Recent Technological and Organizational Changes in Marketing Poultry Meat Products. (Part 14, Sec. d, Page 7)
- Vt., 38, Marketing Margins as Associated with Changes in Consumer Services. (Part 14, Sec. e, Page 16)
- W. Va., 98, Economics of Packaging Selected Foods. (Page 6)

WM-25

Case Studies of the Economic Effects of New Marketing Technologies.

1. To study and develop research methods which are appropriate for appraising the economic effects of technological developments:
 - a. Those directly affecting cost structures, and
 - b. Those directly affecting consumers.
2. To evaluate the probable impact of expected technologies and innovations in selected industries in terms of
 - a. Final impact or long-time effects, and
 - b. Short-run and intermediate effects, including problems of adjustment.

Contributing State Projects:

- Idaho, 292, Case Studies of the Impact of Technology in the Marketing of Dairy Products and Potatoes. (Page 7)
- Wash., 1309, Case Studies of Economic Effects of New Technologies in Fruit and Dairy Marketing in Washington. (Page 8)

INTER-REGIONAL PROJECT

IRM-1
(See Section a
of Agricultural
Economics)

National Policies for Agricultural Prices and Income.

To (1) analyze national agricultural price policies and problems not adapted to the individual commodity approach, such as: (a) comparison of various programs for expanding food consumption, and their effect on agricultural income; (b) the effect of price changes and price programs upon the over-all production responses of agricultural products; (c) problems involved in adjusting agricultural production to price changes, and various methods of facilitating production adjustments; (d) the effects of price movements and business cycles on agriculture as compared with the non-agricultural economy and on the income and cost inter-relationships between the farm and non-farm segments of the economy; and (e) alternative price and income parity concepts and their use in governmental programs; and (2) study the combined and inter-acting effects of national price policies for individual agricultural commodities on the use of resources, the incomes of various farm groups, and the over-all income of farm and non-farm people.

Contributing State Projects:

Mich., 843, Analysis of Actual Changes in Food Patterns as Family Incomes Vary. (Page 3)

Minn., 1129, An Economic Analysis of Demand Expansion Policies and Programs for Food in the United States. (Page 3)

W. Va., 100, Effects of National Production Control and Price Support Programs on Incomes of Farmers in the Appalachian Area. (Page 11)

LIST OF SUMMARIES OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

SESD-OD-1103:		
Summary	Subject-Matter Area	Title of Summary
Number		
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Com- modities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Develop- ment b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Industry	a. Beef Cattle b. Sheep & Goats c. Swine
5.	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	Food Science & Technology (Secs. a, b and c)
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry
12	Fruits & Nuts	Fruits & Nuts

SESD-OD-1103 : Summary : Number :	Subject-Matter Area :	Title of Summary :
13	Home Economics	a. Human Nutrition b. Housing c. Clothing and Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Orna- mental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology & Botany b. Diseases of Field Crops c. Diseases of Fruit Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils & Fertilizers	Soils & Fertilizers
22	Vegetables	a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control

February 1957

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Part 15

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FEDERAL-GRANT RESEARCH
STATE AGRICULTURAL EXPERIMENT STATIONS

FEBRUARY 1956

METEOROLOGY

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CURRENT SERIAL RECORDS

Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

CLIMATOLOGY

- Ill. Illinois Weekly Precipitation Probability Project. Produce weekly summary IBM cards for 10 weather stations in state so probability studies of meteorological parameters on regional basis can be accomplished.
Hort. 65-316. NC-26. Coop. USWB.
- Ind. The Analysis & Interpretation of Indiana Weather Records.
(1) Record on IBM cards data from each location in state for which records cover 10 or more years. (2) Make certain statistical analyses of data by years, seasons, months, weeks & days. (3) Keep past, present & future climatic data current & available for use. All original copies of past state weather records will be assembled at Purdue & each record of 10 or more years punched on U. S. Weather Bureau IBM cards. Frequency of occurrences for each climatic factor recorded will be considered in statistical analysis. Frequency studies will be made in detail for precipitation & temperature. One set of master cards will be stored at Purdue & the other in U. S. Weather Bureau archives. Weather Bureau will furnish cards at no cost.
Agron. 830. NC-26. Coop. USWB.
- Iowa Defining Climatic Factors, Determining Risks & Methods of Minimizing Them. To determine climatic conditions pertinent to crop growth in Iowa, & agricultural activities in general, & to estimate probability of occurrence of these conditions, particularly (1) frequency distribution of daily maximum & minimum temperatures, particularly for season when it is of major concern to growers & processors; (2) frequency distributions of rainfall amounts of importance to agriculture; (3) summarization of soil temperature data to determine effects of color, texture, & water content on soil temperature; & (4) cooperation with other sections in solving problems involving weather factors.
Agron. 1192. Coop. Weather Bureau (USDC).
- Iowa Recording & Processing Meteorological & Phenological Data for Use in Agriculture. To (1) put additional Iowa weather on punched cards, (2) analyze & interpret Iowa weather data, & (3) coordinate Iowa weather data & reports with similar information in the North Central states.
Agron. 1280. NC-26. Coop. USWB.
- Kans. Weather in Relation to Kansas Agriculture. (1) Put Kansas weather data on punch cards. (2) Analyze, interpret & report weather data. (3) Coordinate weather data & reports with similar information of other North Central states. (4) Study relation of weather to methods of crop production, livestock management, & agricultural marketing.
Agron. 437. NC-26. Coop. USWB.

- Mich. Analysis & Interpretation of Climatological Information.
 (1) Facilitate analysis of climatological information for agricultural purposes. (2) Prepare summaries of weather conditions at selected locations as Detroit, Bay City & Kalamazoo. Agr. Engin., Pl. Physiol. 814. NC-26. Coop. USWB.
- Mo. Effects of Climatological Variations on Agricultural Production in Missouri. Continue assembling Missouri's climatological records; process data & punch weather records on IBM cards, thus assisting in fulfillment of major objectives of Regional Project NC-26. Prepare analyses of climatological data important to agricultural production as: determination of probability of precipitation amounts for climatological stations in state. Establish adequate weather instrumental installations at experiment station so as to provide information to be used in research dealing with effects of weather on agricultural production.
 Soils 281. NC-26. Coop. USWB.
- N. J. A Determination of the Length of Growing Season & of the Quantity & Dependability of Precipitation During the Growing Season in New Jersey. No objectives listed.
 Met. 376.
- N. Dak. Weather Information for Agriculture in North Dakota. To (1) make weather data & climatic summaries more readily available to North Dakota agricultural workers. (2) Record & summarize North Dakota weather data in a manner in which it can be coordinated with similar data for the region. (3) Determine what additional weather data, not now available but of value in agricultural research, should be taken & to encourage initiation of observations to obtain such data.
 Met. 32. NC-26. Coop. USWB.
- Tex. Relationship of Variations in Climatic & Soil Moisture Factors to Yields & Their Effect on Dryland Farming & Ranching Decision-Making in High & Rolling Plains Area of Texas. (1) Learn relationships between variations in various climatic & soil moisture factors & yields of crops & forage in High & Rolling Plains area of Texas for different soil types & under different soil management. (2) From above relationships, develop prediction equations for yields based on certain climatic & soil moisture factors known at a given time of year, & other factors. (3) In terms of above, define drouth & attempt to obtain probability of occurrence of drouths of various lengths & intensities. (4) Learn how variations in yields influence farmers & ranchers in area. (5) Develop precautions for uncertainty based on knowledge obtained from above.
 Agr. Econ., Agron., For., Soc. 1022. Coop. SWCRB.

Wis. Probability of Wet or Dry Weather in Wisconsin. Summarize occurrences of excessive & insufficient precipitation periods for 10 Wisconsin cities as a function of probability of occurrence of rainfall amount at given time; probable length of wet & dry spells; critical amounts determined by soil types, vegetation, & estimates of evaporative water loss.
Soils 947b. NC-26

MICRO-CLIMATOLOGY

Idaho The Effects of Air Pollution by Fluorine on Plants, Animals, Soils & Water Supplies. To learn effects of air pollution by fluorine on plants, animals, soils & water, & to study effects of low levels of fluorine on fundamental physiological processes in plants.
Agr. Chem. 43. W-39.

Iowa Soil & Climatic Factors Affecting the Efficient Use of Water by Crops. To (1) determine moisture properties of Iowa soils (moisture holding capacity, wilting point, available soil moisture), (2) determine evapo-transpiration of different major crop covers on different soils under different weather conditions (particularly on corn), (3) investigate rate of replenishment of soil & subsoil moisture in relation to climate-crop factors, rainfall, evapo-transpiration, runoff, crop cover & mulch, (4) develop a technique for estimating soil moisture over large areas from meteorological data & from limited soil moisture samples, (5) determine optimum soil moisture range for crop growth at different growth periods, under different air temperature conditions, (6) obtain moisture data at specific locations & times, for use in agronomic interpretations, & (7) determine root distribution & development under different subsoil moisture conditions.
Agron. 1276. Coop. ARS, WB.

Mo. Investigations of the Effects of Meteorological & Climatological Variation on Agricultural Production in Missouri. (phases a, b, c, d.) To (1) define Missouri's climatic characteristics; (2) study transfer of energy & water vapor between atmosphere & plant & soil surfaces, obtaining information on temperature of soil, temperatures within & above plant covers, & water losses by transpiration; & (3) aid the Departments of the Division of Agricultural Sciences in the definition of weather factors affecting agricultural production.
Soils, Field Crops, Hort. 210. Coop. USWB.

N. J. Microclimatology & Its Relation to Agriculture. Work will consist of (1) translation of Geiger's "The Climate of the Layer of Air Near the Ground", (2) selection of material from above which is of interest to American farmers, forestry, etc., (3) supplementing this material with incorporation of very scattered American & foreign literature, with extensive chapters on forestry, front protections, etc., & (4) preparation of an extensive bibliography (International).

Met. 377.

N. Y. A Study of the Relationships Between Topography, Climate & Microclimate, and Crop Growth & Yield. To attempt to determine (1) what variations in weather, climate & microclimate may be significant in producing special & temporal variations in plant growth & crop yield; (2) at what stages in growth of a plant meteorological variations may be most significant in their effect on final yield; & (3) relationships between microclimate & topography so that variations in microclimatic conditions may be estimated within areas where instruments are not situated.

Agron. 36.

REGIONAL PROJECTS

NC-26 Weather Information for Agriculture. 1. To analyze & interpret information on weather & climate with respect to its application to agriculture. 2. To prepare regional summaries of data on weather & climate as related to agriculture. 3. To compile or collect phenological data in the region. 4. To aid in coordinating & standardizing studies & reports made by cooperating agencies on the influence of weather on agriculture in the region. 5. To encourage the development of instruments needed to acquire weather information useful to agriculture.

Cooperating stations: Federal-grant projects - Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Indiana, South Dakota and Wisconsin.

W-39 Effects of Fluorine on Plants, Animals & Soils. 1. To conduct research on the effects (assimilation, physiological reactions, & other metabolic processes) of different levels of fluorine in specified plants & animals. 2. To investigate the accumulation of fluorine in soils, its reaction in the soil & its effect upon plants. 3. To develop and/or evaluate simplified or other methods for determination of atmospheric fluorides. 4. To develop techniques for the alleviation of fluorine injury to plants & animals.

Cooperating stations: Federal-grant projects - California, Colorado, Idaho, Montana, Oregon, Utah and Washington.

LIST OF SUMMARIES OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

SESD-OD-1103 :			:
Summary	:	Subject-Matter Area	:
Number	:	:	Title of Summary
1	Agricultural Chemistry <u>2</u> /		Agricultural Chemistry
2	Agricultural Economics <u>2</u> /		a. Prices & Incomes & General Studies of Commodities or Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering <u>1</u> /		a. Land & Water Use & Development b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Industry <u>1</u> /		a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry <u>1</u> /		Dairy Cattle
6	Dairy Technology <u>1</u> /		Dairy Technology
7	Entomology & Economic Zoology <u>1</u> /		a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops <u>1</u> /		a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology <u>1</u> /		Food Science & Technology (Secs. a, b and c)
10	Forage Crops, Pastures & Ranges <u>1</u> /		Forage Crops, Pastures & Ranges
11	Forestry <u>1</u> /		Forestry
12	Fruits & Nuts <u>2</u> /		Fruits & Nuts
13	Home Economics	<u>1</u> /	a. Human Nutrition
		<u>1</u> /	b. Housing
		<u>2</u> /	c. Foods
		<u>2</u> /	d. Household Economics & Equipment

1/ Summary Available

2/ Summary will be available by February 1, 1957

SESD-OD-1103 Summary Number	:	Subject Matter Area	:	Title of Summary
14		Economics of Marketing <u>2/</u>		a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15		Meteorology <u>1/</u>		Meteorology
16		Ornamental & Drug Plants <u>2/</u>		Ornamental & Drug Plants
17		Plant Pathology & Bacteriology <u>1/</u>		a. Plant Pathology & Botany b. Diseases of Field Crops c. Diseases of Fruit Crops
18		Plant Physiology & Nutrition <u>1/</u>		Plant Physiology & Nutrition
19		Poultry Industry <u>2/</u>		Poultry Industry
20		Rural Sociology <u>1/</u>		Rural Life Studies
21		Soils & Fertilizers <u>1/</u>		Soils & Fertilizers
22		Vegetables <u>1/</u>		a. Vegetable Crops b. Potatoes
23		Veterinary Science <u>1/</u>		Veterinary Science
24		Weeds <u>1/</u>		Weed Control

1/ Summary Available

2/ Summary will be available by February 1, 1957

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FEDERAL-GRANT RESEARCH
STATE AGRICULTURAL EXPERIMENT STATIONS

FEBRUARY 1956

PLANT PHYSIOLOGY & NUTRITION

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

BASIC INVESTIGATIONS

- Ala. Causes of Variability in the Activity of Herbicides. To (1) study effects of the following on activity of herbicides: a. environmental factors, b. plant factors, and c. non-herbicidal agents, as spreaders, stickers, & other agents; & (2) search for new herbicides, looking for a specific type of chemical to break a link in reproductive or vegetative cycle of a particular weed.
Bot. 545. S-18.
- Ariz. The Relationship Between Free Auxin Content and Susceptibility of Noxious Plants to Control by Chemicals. To determine whether a relationship exists between free auxin content in noxious plants at the time of spraying with systemic herbicides and final percentage of kill, and if a relationship exists, whether free auxin content in the plant can be correlated with any external characteristics of the plant.
Agron. 366. W-11.
- Ark. Physiological Effects of Selected Herbicides on Cotton, Soybeans and Noxious Weeds. Establish maximal limits of certain herbicides for cotton & soybeans, & minimal requirements for control of noxious weeds, as may be influenced by age of plants & environmental conditions. Learn degree to which varieties within given species differ in their tolerance to any given herbicide & learn cause of differences. Investigate mechanism by which herbicides kill plants.
Agron. 408. S-18.
- Calif. Physiological, Ecological and Chemical Studies of the Control of Weeds. To study (1) test for the oily residue (after stove oil sprays) in carrots and to adapt this test to a method for determining the rate of loss of the oil residue and the marketability of submitted samples of carrots, (2) location of the residue and methods of removal, (3) correct stage for spraying onions, garlic, and such other vegetable crops as may submit to selective herbicidal action, (4) physiological or chemical basis for selectivity of herbicides, (5) fractionation of oils to identify the specific compounds responsible for the killing action, and objectionable flavors, (6) possible combinations that kill the weeds without leaving an objectionable residue, and (7) systematic study of organic compounds that show selective herbicidal action.
Veg. Crops 833.
- Calif. The Anatomical & Physiological Responses of Woody Species to Herbicides. A Program of Brush Control for California. To (1) study toxic action of chemicals on woody plants in relation to plant structure, age, seasonal growth & environmental factors; (2) make physiological studies for species tolerance, mechanics of absorption, translocation into roots, & biochemistry of killing action; & (3) make exploratory work with new materials.
Bot. 1400.

- Calif. The Translocation of Herbicides in Plants. The Use of Radioactive Isotopes & Other Indicators to Study Absorption & Distribution of Herbicidal Chemicals. To (1) study relation of molecular configuration to absorption & translocation of herbicides, (2) determine when applied chemical enters the plant and in what quantity, & (3) know their ultimate distribution with respect to vulnerable meristematic tissues.
Bot. 1430.
- Calif. Brush Seedling Establishment and Growth in Relation to Soil Fertility Levels. To determine (1) if brush increase is related to soil fertility level; and (2) to what extent brush can be controlled by increasing soil fertility thru fertilization.
Agron., For., Soils 1570. W-25.
- Calif. Penetration of Herbicides. To (1) learn how to increase penetration of herbicides & thus enhance the possibility of greater effectiveness in their use; & (2) study intimate mechanisms involved in passage of such chemical across plant membranes.
Bot. 1583. W-11.
- Colo. Studies on Physiological Factors Related to Weed Control. To (1) learn relationships of physiological activities to herbicidal reaction; & (2) relate these studies toward devising or improving means of controlling or eradicating weeds with maximum efficiency & minimum injury to associated plants, soils, animals, & man.
Bot., Pl. Path. 214. W-11.
- Conn. The Influence of Soil Factors on the Herbicidal Effectiveness of Certain Carbamates. To determine the influence of soil moisture, texture, organic matter content & pH upon herbicidal activity of these carbamates: isopropyl N-(3-chloro-6-methoxyphenyl) carbamate, sec. butyl N-phenyl carbamate; isopropyl N-(3-chloro-methoxyphenyl) carbamate, isopropyl N-(3-methylphenyl) carbamate, isopropyl N-3, 6-dichlorophenyl carbamate, & isopropyl N-(3-chloro-phenyl) carbamate.
Agron. 221. NE-12.
- Del. Persistence & Penetration of CMU in Asparagus Soils. To determine degree of persistence & penetration of CMU (3-parachlorophenyl-1, 1-dimethylurea) in asparagus soils particularly as affected by irrigation & soil organic matter.
Hort. 549-649. NE-12.
- Ga. Control of Noxious Perennial Weeds by Chemical & Cultural Methods. To make greenhouse studies of absorption, translocation, and volatility of herbicides for control of nutgrass, Johnsongrass, and wild onions, and to field test the herbicides that show up favorably.
Agron. 43. S-18.

- Idaho Physiological & Anatomical Effects of Herbicides & Associated Treatments on Canada Thistle, Perennial Ground Cherry, Field Bindweed, & Poverty Weed. To develop information on behavior of four above named weed species as: relative rate & direction of translocation of herbicides & effect of associated treatments which may facilitate translocation; comparative anatomy or morphology of these species & relation of these factors to environmental adaptability, competitive ability & methods of control; effect of chemical & mechanical treatments on vegetative & sexual reproduction.
Agron. 45. W-11.
- Ind. Physiological Studies of Herbicides in the Control of Perennial Weeds. To (1) learn seasonal variations in chemical constituents of perennial weeds & correlate variations with the efficacy of various cultural & chemical control practices; (2) investigate movement of herbicides in underground portions of certain perennial weeds & learn influence of additives & environment on this movement; & (3) investigate tolerance of weed & crop plants to promising herbicides & to study physiological response of plants to such materials.
Bot. 778.
- Md. Influence of Environmental Factors on the Effectiveness of Several Carbamate Herbicides. To (1) determine influence of water, soil texture, soil pH, soil fertility level, & temperature on effectiveness of several carbamate herbicides; & (2) physiological, chemical & morphological changes in plants induced by use of these herbicides.
Agron. B-58-d. NE-12.
- Mich. Control of Weeds by Chemical Means. To determine (1) some effects of herbicides on basic physiological processes of weeds & crop plants; (2) effects of herbicides on production, keeping quality & palatability of vegetable crop products; & (3) effects of continued application of herbicides upon growth of crop plants & weed populations in treated soils.
Bot., Farm Crops 32.
- Mich. The Role & Fate of Herbicides, Antibiotics, Growth-Regulating Substances & Other Compounds in Different Soil Types. To (1) study residual effects of herbicides, antibiotics & plant hormones in different soils; (2) find effect of various compounds on microbial flora of soils; (3) find species of bacteria which might prove helpful in aiding disintegration of herbicides; & (4) determine effect of biuret on plant growth, to determine the cause of transformation of urea to biuret, & to determine biuret content of various commercial sources of urea.
Soil Sci. 123.

Mich. Factors Affecting the Germination of Weed Seeds. To determine (1) physiological characters of dormancy in weed seeds; (2) needs for testing viability of weed seeds; (3) factors affecting weed seed longevity; and (4) develop methods of weed control based on such improved understandings.
Agron. 467. NC-10.

Miss. Studies on the Effect of Herbicides on Weeds & Crops. To (1) study absorption, translocation & certain physiological actions of selected herbicides in appropriate plant species; (2) study histological & cytological responses of cotton & perhaps other species to selected post-emergence herbicides & seek to determine if differences in internal & external morphology of certain species are responsible for differential responses to some herbicides; (3) determine movement pattern, persistence, & action on crop species of herbicides in different soils; (4) evaluate influence of climatic & soil factors upon vapor activity & herbicidal action of promising herbicides; & (5) evaluate effects of new herbicides upon selected crops & weeds & develop practical methods for safe use in controlling weeds on cropland and other areas.
Pl. Path. RRFL-1. S-18.

Miss. The Residual Effect of Various Herbicides on Cotton & Other Crops. To (1) determine rate of disappearance of certain herbicides from soil under field conditions; & (2) evaluate effects of these herbicides on crop and weed plots under varying soil conditions.
Pl. Path. RRFU-3. S-18.

Miss. Studies of the Effects of Herbicides upon Weeds & Crops. To (1) study physiological action of herbicides upon crops & weeds; (2) determine influence of climatic, biotic & edaphic factors on action of selected herbicides; (3) determine effects of herbicides on soils & plant succession following their use; & study their movement patterns in soils; (4) evaluate effects of new herbicides upon selected crops & weeds; (5) develop agricultural usages & practical methods of employing herbicides for controlling weeds selectively in crops & grasslands, ponds, orchards, etc.; (6) develop methods of employing herbicides for non-selective control of weeds in non-agricultural areas; & (7) develop, adapt, & evaluate equipment for accomplishing objectives (5) & (6).
Pl. Path. PL-4.

Mont. Physiological and Ecological Factors Influencing the Life Cycle of the Wild Oat (*Avena fatua*) as Related to Control. To (1) determine factors which influence dormancy, germination and longevity in wild oat seed; and (2) develop methods of reducing the wild oat seed population in cultivated soils.
Agron. 140. W-11.

- Mont. Factors Affecting Sagebrush (*Artemisia tridentata* var. *Tridentata* nutt) Seed Germination. To determine effect of temperature, moisture, & other factors on the capacity of sagebrush seed to germinate, in order to develop a sounder basis for prediction of success of artificial measures leading to the reduction of sagebrush stands.
Rge. Mgt. 924. W-25.
- Nebr. Factors Affecting Bud Dormancy in Plants. To determine nature of bud dormancy in plants and to develop weed control measures based on such findings. 1. Biochemical analysis of plant and bud tissues to determine inherent control mechanisms such as enzyme levels, hormones, growth substances, carbohydrates, etc. 2. Determine effects of varying nutritional levels thru use of tissue culture technique using excised buds. Compare proteins, amino acids, carbohydrates and enzymes. 3. Screen and develop chemicals which may have value in inducing or breaking bud dormancy, starting with ethylene chlorohydrin, indoleacetic acid, phenoxyacetic acid, and urea derivatives.
Agron. 478. NC-10.
- N. H. Light & Temperature Effects on Phototoxicity with Respect to Herbicides. To study (under greenhouse & controlled environmental chambers) effects of light intensity, light quality, & temperature on toxicity to plants of herbicides with emphasis on 2,4-D acids and several of its derivatives, and CMU and others of substituted ureas.
Bot. 38. NE-12.
- N. Mex. The Association of Plant Characters with the Differential Tolerance on Strains of Field Bindweed to Growth Regulator Herbicides. To (1) screen field bindweed for strains with differential tolerance to killing action of growth regulator herbicides; (2) determine if differential tolerance of bindweed strains is related to apparent differences in translocation of growth regulator herbicides; & (3) relate differences in carbohydrates, N compounds, respiration and metabolic products to selective action of regulators on bindweed strains.
Agron. 50. W-11.
- N. Y. The Role of Soils in Plant Response to Herbicides. To study (1) influence of soils on fate of herbicides; (2) influence of herbicides on soils; & (3) plant response to herbicides as influenced by the two factors above.
Agron. 80. NE-12.
- N. Y. The Influence of Soil Factors on the Activity of Herbicides. To determine (1) effects of soil moisture, organic matter, texture & related factors on the fate & activity of important herbicides such as the phenoxy compounds, carbamates, ureas, dinitros, etc.; & (2) develop working recommendations for these herbicides over widest possible range of environment.
Veg. Crops 81. NE-12.

- N. Dak. Some Factors Affecting the Control of Annual Weeds. To determine physiological & environmental factors affecting germination, dormancy & viability of annual weed seeds & devise improved chemical or cultural control methods.
Agron. 76. NC-10.
- N. Dak. Germination & Development of Common Annual Weeds: French-weed, Mustard, Ragweed, Marsh Elder, Lambsquarters, Pigweed, Burning Bush, Prickly Lettuce, Peppergrass, Catchfly, Wild Buckwheat, & Pigeongrass. To determine germination period & rate of development of common annual weeds.
Agron. 146.
- Okla. Basic Mechanism of Herbicidal Action. To (1) determine rates of absorption & distribution within plant of chemical compounds that may be effective herbicides; (2) determine relative movement of herbicides into root system of woody plants; (3) determine the tissues involved in translocation; (4) determine factors affecting translocation; (5) study changes in chemical composition of plant cells after herbicide treatment, especially cell wall changes; & (6) learn effects of herbicides on growth hormone systems of plant in effort to learn if herbicides are acting on the natural auxins responsible for plant growth.
Bot., Pl. Path. 888.
- Oreg. Effects of Herbicides & Growth Regulating Substances upon the Enzyme System of Plants. To (1) learn mechanisms by which 2,4-D & other herbicides exert their action upon plants; (2) seek other methods of testing efficacy of new compounds as herbicides; & (3) accumulate necessary fundamental knowledge of plant metabolism & herbicidal action which may permit more effective development & use of herbicides.
Agr. Chem., Farm Crops 41-11. W-11.
- Oreg. Use of Isotopes in Studying Fundamental Agricultural & Biological Problems. I. The Mode of Action of 2,4-Dichlorophenoxyacetic Acid. To study the process by which 2,4-D exerts its selective herbicidal effect on some noxious plants.
Agr. Chem. 141-D.
- Pa. Microbiological Studies. To determine the effect of organic herbicides on activity of soil microorganisms, & (2) study microbiology of decomposition of organic herbicides in soil.
Bact. 1095-G.
- Pa. Influence of Environmental Factors on the Effectiveness of Herbicides. To determine (1) influence of soil moisture on effectiveness of 2,4-D, CMU, etc. as pre-emergence herbicides on corn; (2) influence of soil organic matter, porosity & fertilizer level on effectiveness of 2,4-D as pre-emergence herbicide on corn; (3) influence of moisture, competition, light & temperatures on 2,4-D injury & weed control; (4) influence of nutrient concentration, N & K balance on 2,4-D injury in greenhouse; & (5) physiological & other changes in plants where injury has been induced by above treatment.
Pl. Path. 1229. NE-12.

- P. R. Virus Diseases of Weeds. To determine (1) identity of viruses attacking weeds in Puerto Rico; (2) means of propagation of viruses of weeds; & (3) in cases where transmission of virus is by insect vectors, to identify insect vectors & relation between vectors & viruses; (4) host range of weed viruses in order to determine if plants of economic value are susceptible; & (5) control methods if plants of economic value are affected by weed viruses.
Pl. Path. 82.
- S. C. Use of Growth Regulating Substances for Weed Control. To investigate & evaluate possibilities of new herbicides for selective control of annual & perennial weeds & grasses.
Bot. 47.
- Tenn. Movement & Persistence of Herbicides in the Soil. To determine (1) persistence of certain herbicides in soil; (2) lateral diffusion of certain herbicides in soil; & (3) how these properties vary with changes in soil moisture, temperature or soil type.
Agron. 56. S-18.
- Tex. The Chemical Control of Plant Growth. Obtain further information about chemical reactions which control plant growth processes as in vivo & in vitro biosynthesis of plant growth substances, mechanisms of auxin action, nature of interaction of light, auxin & mineral elements (especially Zn, Mn, Co, S, K & Mg) in controlling flowering, leaf expansion, elongation growth, dormancy & seed germination.
Biochem. & Nutr. 1032.
- Vt. Time of Seeding & Responses of Forage Seedlings to Climate. To determine (1) early seedling growth of the more important forage species when seeded on different dates in the field & of the various annual weeds normally present in pasture or cultivated soils, particularly the time of emergence & rate of growth of these weeds, & (2) the effect of temperature & length of day on germination & early growth of both crops & weeds under controlled conditions.
Agron. 10. NE-10.
- Va. The Effects of Herbicides on Crop Plants & Weeds. To determine (1) effects of herbicides on food value, texture, flavor, enzymes, vitamins & other quality measures on crop plants, & (2) mode of entry & processes involved in killing action of herbicides on weeds & crops.
Pl. Path. 9375. S-18.
- Wash. The Effect of Growth Regulator Herbicides on the Nitrogenous Constituents of Perennial Weeds. To (1) determine effects of metabolic disturbances caused by growth regulator-type herbicidal applications on the nitrogen compounds of plant root system; (2) determine if a significant relationship exists between effects on N compounds, specifically the amino acids of the proteins, & resistance or susceptibility of the plant to the herbicides; & (3) relate changes in N compounds with carbohydrate changes & enzymatic responses as a means of understanding killing mechanisms & selective actions.
Agron. 1114. W-11.

Wash. Perennial Weed Control. To (1) determine physiological characteristics & ecological relations of creeping perennial weeds as related to herbicidal effectiveness; (2) determine factors affecting entrance & translocation of certain herbicides; (3) determine physiologic changes induced in plants; (4) relate results of physiological studies to methods of control & make control trials; & (5) test new chemicals which show promise for use in controlling weeds.

Agron. 1120.

W. Va. Factors Affecting the Herbicidal Activity of Some Chemicals Applied to the Soil Surface. To study (1) fundamental relations between soil characteristics on the effectiveness of various herbicides as measured by germination & seedling vigor in the greenhouse; (2) effective rate of application of herbicides under controlled conditions of moisture & pH; (3) influence of above soil characteristics as they affect herbicidal activity of 2,4-D, dinitros, etc.; & (4) persistence of herbicidal activity under controlled moisture conditions.

Agron., Gen. 55. NE-12.

Wis. Control of Vegetative Bud Activity in Weedy Plants. To determine more exactly the mechanisms regulating vegetative bud activity in weedy plants and develop methods for controlling weeds by this means.

Agron. 56. NC-10.

WEED CONTROL

Horticultural Crops

Alaska Weed Control of Horticultural Crops. To determine which chemicals and cultural practices or combination thereof are best suited to the control of weeds and their influence on productivity, winter survival, and quality of such crops as lettuce, cabbage, beets, and strawberries.

Hort. AL-1-2-22 (R).

Alaska Effect of Mulching on Survival, Productivity, & Weed Control Practices of Strawberries. To determine (1) effect of mulching and weed control practices on overwintering and productivity of strawberries; (2) if good commercial varieties can be grown successfully when cultured in a manner similar to that used by commercial Stateside growers; and (3) to provide a means of developing strawberry industry with existing varieties until such time as a better variety is released from the hybridizing program.

Hort. AL-1-2-24 (P).

- Ariz. Control of Weeds in Lettuce and Cantaloupes. To (1) screen and evaluate existing herbicides as well as those which may be developed during the time the project is in progress; and (2) make detailed evaluation of herbicides found to be effective as to rate of application, time of application in relation to crop seeding and growth, concentration, and method of application.
Hort. 374.
- Mass. Weed Control in Vegetable Crops. To develop more efficient methods for the control of weeds in vegetable crops through the use of herbicides and/or mechanical means.
Olericulture 325.
- Mass. Control of Weeds in the Nursery by Chemical Spraying. To determine (1) tolerance of woody nursery plants to chemical weed sprays; & (2) means of using them to eliminate these weeds which cannot be reached by the cultivator but must be hoed out.
Land Arch. 512.
- Mass. Weed Control in Cranberries. To discover best means for controlling or eradicating weeds among cranberry vines.
Cranberry 100.
- Mass. Forest Stand Improvement by the Use of Chemicals to Kill Inferior Trees. To test use of various chemicals to kill weed trees in Massachusetts forests.
For. 1030.
- Minn. Weed Control in Vegetable Crops. To improve quality & to reduce production costs of vegetables grown for processing, with special emphasis on weed control.
Hort. 2125.
- Mo. Control of Weeds in Horticultural Crops. To (1) determine effectiveness of presently reported herbicides; (2) devise methods of using herbicidal properties of these chemicals; (3) find selective herbicides suitable for use in 2,4-D-susceptible crops; (4) measure effect of herbicides on yields; & (5) determine effectiveness of various mulching materials in weed suppression.
Hort. 146.

Oreg. The Use of Chemical Herbicides in Oregon Vegetable Growing.
To (1) learn rate of absorption of chemicals thru foliage & roots, & translocation of the chemicals within the plant after absorption, (2) learn rate of absorption & translocation of chemicals in relation to maturity of plant, & different types of plants, (3) learn reactions occurring & the identification of chemicals within the plant which contain the radioactive labelled element, (4) study development of weed control practices in vegetable crops for use by Oregon vegetable industry, (5) study fundamental work about factors of moisture, temperature & timing of application as they influence effectiveness of various promising herbicides, (6) learn differences in length of residual activity in soil of A, B dichloropropionic acid and A, B trichloropropionic acid as influenced by differences in rate of application of chemical, moisture content of the soil, & temperature of the soil, (7) learn differences in selectivity of A, B dichloropropionic acid and A, B trichloropropionic acid toward various crops and influenced by rate of application of chemicals and by time of application.

Hort. 41.

Pa. Effectiveness of Herbicides for Weed Control in Asparagus Plantings. To determine feasibility of using herbicides in weed control in asparagus.

Hort. 1095-E.

Pa. Control of Weeds in Forest Nurseries. To determine effectiveness of chemical treatments.

For. 1095-I.

Pa. Chemical Weed Control in Lima Beans. To investigate weed control methods and techniques applicable to culture of lima beans, with special emphasis on the use of chemical herbicides.

Hort. 1095-J.

Pa. Chemical Weed Control in Spinach. To investigate weed control methods and techniques applicable to culture of spinach, with special emphasis on use of chemical herbicides.

Hort. 1095-K.

Forage Crops

Calif. Control of Herbaceous Range Weeds. To learn how to control herbaceous weeds in the areas they now occupy, how to prevent their further spread and what factors and combinations determine the actual and potential areas of distribution.

Agron. 1635.

- Colo. Weeds Detrimental to the Agricultural & Livestock Industries & Other Interests in the State. To (1) increase effectiveness & practicability of controlling weeds under wide range of environmental conditions & types of farming and ranching common to the state of Colorado thru improving methods now in use, evaluating promising methods, & developing new methods thru coordinated, fundamental field research, & (2) determine the location, extent and importance of those weeds and poisonous plants that constitute or threaten to constitute a serious problem in the state.
An. Husb. 81.
- T. H. Methods in, and Evaluation of, Range Improvement Practices in the Humid Lowland Pastures of Hawaii. To define and measure appropriate practices of brush control, renovation of sward, fertilization & reseeding in pastures of Hawaii in terms of components of pasture sward, forage yield, animal carrying capacity, costs, and returns.
Agron. 129. W-25.
- Idaho The Control or Eradication of Weeds on Pasture and Range Land. To evaluate, improve, devise or discover means of controlling or eradicating weeds on pasture and range lands, with maximum efficiency and minimum injury to associated plants, animals, soils and man.
RM-13.
- Md. Weed Control in Legumes. To (1) further evaluate selective herbicides that may be used for control of various weeds in legumes; (2) study importance of fertilizer rates & placement, & seed rates & placement in establishment of legumes with a minimum of weed competition; & (3) study interrelation of alfalfa varieties, rate of fertilization, use of chemical herbicides, & insect control practices.
Agron. B-58-c.
- Mass. A Comparison of Chemical Composition of Weeds & Their Companion Plants. To (1) determine chemical composition of weeds & cultural plants as to nitrogen, phosphorus, potassium, calcium and magnesium content; and (2) measure relative capacity of several forage grasses to absorb potassium in competition with certain forage legumes in Project No. 50. Species will include important crop & grassland plants & a representative collection of noxious weeds commonly found in the Connecticut Valley.
Agron., Chem. 305.
- Mass. Control of Forage Crop Weeds in Massachusetts. To (1) control weeds in new seedings of grass-legume mixtures; (2) control chickweed in alfalfa; (3) control perennial weeds in grasslands; & (4) use herbicides in control of weeds & weed grasses in renovation of old sods.
Agron. 501.

- Miss. Control of Perennial Weeds, Brush Species & Other Weeds in Pastures. Pasture Investigations: To (1) determine chemical control procedures for undesirable species in spring, summer & winter pastures; and (2) study the use of chemicals in the renovation & establishment of pastures.
Pl. Path. & Physiol. FL-4.
- Nev. The Control of Certain Weeds in Native Meadows & Pastures. To learn enough of ecology & responses of herbicides & mechanical treatment of certain meadow weeds to be able to describe dependable, feasible control measures, studying foxtail barley, blue flag, & arrowgrass, first, in that order.
Agron. & Soils 99. W-11.
- Pa. The Control of Broadleaf Plants in Forage Plantings with Herbicides. To determine time & rate of application of herbicides necessary to control weeds in forage plantings, without eliminating legume plants.
Agron. 1095-C.
- Tex. Control of Weeds & Improvement of Grasses on Ranges. To (1) assemble & incorporate all pertinent data obtained to date on studies under former projects 415 & 389; (2) determine relative value of certain range management practices for bitterweed control; (3) determine effect of certain range management practices on native vegetation & production of livestock & livestock products; (4) determine desirability of deferred rotation grazing as compared with continuous grazing; & (5) determine value of mechanical & chemical methods for bitterweed control.
An. Husb. 902.
- Va. Control of Undesirable Plant Species in Pastures & Other Non-Crop Areas. To develop (1) safe & economical chemical methods for removing undesirable annual & perennial weeds from pastures & lawns; (2) methods for killing unwanted woody plants growing in wood lots, fence rows, and rights-of-way.
Pl. Path. 8450.

Cereal Crops

- Ga. The Use of Chemicals for Weed Control & Defoliation of Crop Plants. To determine (1) most economical method to control weeds in cultivated areas; (2) most satisfactory & economical methods to control weeds in small grain & sod crops; & (3) effectiveness of materials used for defoliation of cotton & other crops & what effect chemicals have on quality & quantity of crops harvested.
Agron. 34.
- Ky. Control of Weeds in Agronomic Crops with 2,4-D & Other Chemicals. To develop practical procedures & methods for the control of weeds in agronomic crops by the use of 2,4-D & other chemicals.
Agron. 15.

- Mont. Economic Evaluation of Alternative Methods of Control of Canada Thistle in Irrigated Crops of the Gallatin Valley. To determine the economy of alternative methods to control Canada thistle in small grain & associate crops where economy is measured in terms of increased net value of product.
Agr. Econ. 118.
- Nev. Cotton Weed Control in Southern Nevada. Test weed control measures developed in other areas for Nevada conditions, find economical control for Johnson grass & perennial morning glory.
Agron. 15.
- Pa. Weed Control in Corn by Pre-Emergence & Post-Emergence Herbicidal Treatments & Cultivation. To (1) determine effect of herbicides on weeds in crops, (2) determine extent of injury & other effects on yield & maturity, (3) evaluate time effects on herbicide applications, (4) study effects of soil & climatic factors on weed control, (5) study relation of planting depth to herbicidal injury, (6) compare effect of 2,4-D formulations on seedlings, & (7) make anatomical studies of methods of herbicidal injury.
Agron. 1095-A.
- Va. Chemical Weed Control in Corn & Alfalfa. Develop safe & economical chemical control of various types of weeds at different stages of growth in alfalfa and corn.
Agron. 8459.
- W. Va. Weed Control in Corn. 1. To determine & demonstrate effective methods of weed control in corn, under W. Va. conditions. 2. To study chemical weed control as related to type of herbicide, concentrations employed, & time & frequency of applications to corn. 3. Compare cultural methods of weed control, including flame cultivation, with chemical control in corn. 4. To determine crop & weed response to the various methods of weed control. 5. To secure information on the economic losses caused by weeds & the cost of control methods in corn.
Agron. 22.

Field Crops

- Calif. Chemical Weed Control in Cotton. To develop (1) satisfactory programs of weed control in cotton culture by controlling annual & perennial weeds in cotton fields, & by controlling similar weeds in nearby areas that act as weed seed reservoirs; & (2) comparative programs in other row crops using as a basic source of information the results obtained from investigations in cotton.
Bot. 1568.

- Fla. Herbicidal Control of Weeds in Peanuts & Oats. To evaluate effectiveness & economy of herbicides for weed control in peanuts & oats.
Agron. 694. S-18.
- Minn. Weed Control with Particular Reference to Field Crops. To improve methods of weed control now in use by investigation of potential methods with chemicals; cropping practices & mechanical means, to study techniques in field & lab for weed control investigations.
Agron. 1301.
- Mont. To Control Annual & Biennial Weeds in Field Crops. To (1) control annual & biennial weeds in grain crops by use of selective herbicides; (2) control annual weeds in row crops such as beans, peas & sugar beets; & (3) evaluate new herbicides for control of annual & biennial weeds.
Agron. & Soils 136.
- Ohio Eradication or Control of Weeds & Other Undesired Plants.
I. The Chemical & Cultural Control of Weeds in Field Crops.
To study (1) use & effectiveness of chemicals alone & with tillage in weed eradication compared with tillage alone & rates, dates & methods of application of chemicals for maximum effectiveness on weeds & minimum injury to crops; (2) effects of herbicides on seed germination, composition, palatability & other important properties of crop; (3) action of different varieties of crops to herbicides; (4) to devise specific systems of treatment for major noxious weeds of the state, using chemical, mechanical & crop competition methods or combinations of them; & (5) to study relation of crop rotations to weed control.
Agr. Engin. 20-1.
- Pa. Control of Weeds in Potatoes by Pre-Emergence & Post-Emergence Treatments & Oil Spray. To determine (1) effectiveness of herbicides in rows by pre-emergence applications; (2) optimum concentrations for pre- & post-emergence applications; (3) effect of herbicides on tuber quality; & (4) possibility of controlling grass & weeds by oil sprays & chemical herbicides applied as post-emergence treatments.
Agron. 1095-D.
- Va. Weed Control in Field Crops. To develop methods & practices for efficiently & economically controlling weeds in peanuts, soybeans, small grains, cotton & tobacco.
Agron. 8449.

Lawns & Turf

- Ohio Weed Control in Turf. To grow turf free of weeds by the use of chemicals and/or good maintenance practices.
Agron. 20-6. NC-10.

Ponds & Ditches

- Ariz. The Control of Weeds on Irrigated Lands. To determine the most effective & economic methods of weed control on the irrigated lands of Arizona.
Agron. 261.
- N. Mex. Chemical Weed Control on Cropland, Irrigation Systems, & Water Courses. To (1) determine germination requirements & longevity of weed seeds under N. Mex. conditions; (2) utilize information gained under objective (1) to determine the influence of temperature, moisture & soil conditions on the action of herbicides on germinating seedlings; (3) further these, evaluate environmental variables as they affect the action of herbicides on emerged seedlings; (4) relate differences in enzyme systems & other plant constituents to the selective action of herbicides on resistant & tolerant strains of perennial weeds of the same species; (5) utilize knowledge of crop & weed ecology to pre-disposed infesting weeds to the selective action of herbicides; (6) determine the toxicity of growth regulator herbicides to salt cedar, and the variables affecting their action; & (7) evaluate in screening tests the effects of new herbicides on the growth & quality of field & horticultural crops & on the weeds common to these crops.
Agron. 46.
- S. C. Maintenance of Drainage Channels. To (1) test, modify or develop light machinery for removing silt & vegetation from open channels; (2) determine effective & economical methods for controlling aquatic plant growth in drainage channels, with major attention to chemicals & equipment for applying chemicals; & (3) determine effectiveness of selected grasses on ditch side slopes in reducing growth of undesirable plants, & in reducing erosion of the side slopes.
Bot., Chem. 66.

Non-Agricultural Land

- R. I. Factors Affecting the Control of Nutgrass with Substituted Ureas, Alone, or in Combination with Other Herbicides. To (1) determine to what extent soil pH, fertility & moisture influence time needed by substituted ureas to eradicate nutgrass; (2) find how these factors affect residual toxicity; & (3) discover if other herbicides such as phenyl mercurials will enhance effectiveness of the substituted ureas.
Agron. 20. NE-12.

- R. I. Water-Soluble Mercurials & Other Chemicals for Crabgrass Control. To determine a satisfactory chemical method of crabgrass control.
Agron. 25.

- Utah Eradication of Perennial Weeds by Replacement with More Useful Plants. To devise a practical procedure for replacing weedy vegetation on non-tillable areas with a more desirable type of vegetation. Study will include these weeds: Russian knapweed, white top, morning glory & Canada thistle.
Agron. & Soils 465. W-11.

Poisonous Plants

- Tex. Distribution, Abundance, Economic Importance & Control of Poisonous Plants on Range Lands. To (1) obtain information on distribution & abundance of plant species toxic to range livestock; (2) secure & compile data on losses of livestock on basis of weed species, season & area involved; (3) secure for each species data on nomenclature, description, distribution, sites of infection, toxic nature, etc. & methods of control; (4) determine toxic species if & when losses warrant, by field investigations & feeding experimentation; & (5) determine by field experiments, quantitative & seasonal control data on chemical control of toxic species in problem areas.
Vet. Res. 608.

Brush

- Ariz. Control of Noxious Shrubs on Southwestern Ranges. I. Cholla & Prickly Pear Cactus (Opuntia spp.). II. Burroweed (Aplopappus tenuisectus). To test the effects of various herbicides on cacti & burroweed.
Rge. Ecol. 285. W-11.

- Ariz. Factors Affecting the Noxious Shrub Control Program on Arizona Rangeland.
I. Effects of Shrub Control on Forage Production.
II. Effects of Controlled Season Burning on Forage Production.
III. Determinants of Site Potential for Shrub Control.
292.
- Ark. Herbicidal Brush & Weed Control for Range Development & Pasture Improvement. To learn (1) effect of herbicides on woody growth & pasture weeds, (2) succession of plants following herbicidal removal of brush & small trees, and (3) if additional operations other than removal by herbicides are needed to improve treated areas.
Agron. 404.
- Colo. Improving Sagebrush Lands to Obtain Maximum Range Livestock Production. B. Eradication Phase. To determine most practical & economical methods to improve sagebrush rangelands of low productivity by using the following better range management practices, singly or in combinations: a. use of scientific grazing systems & other improved livestock management practices, b. eradication of sagebrush, and c. artificial reseeding of both abandoned croplands & treated sagebrush lands to adapted forage plants.
For. & Rge Mgt. 65b.
- N. H. The Effects on Vegetation of Weed-Control Measures Applied to Woody Plant Areas. To determine (1) in areas such as public utility lines where extensive work is being carried on in New Hampshire, the qualitative & quantitative effects of relatively non-selective foliar spraying on the ecological successions of desirable plants & weeds; & (2) effects on vegetational successions of currently used weed control practices in blueberry pastures.
Bot. 31.
- N. Mex. Control of Mesquite on Desert Plains Grassland Ranges. To develop methods for control by (1) chemical treatments of large plants on heavily infested areas, & (2) mechanical treatment of small plants on slightly infested areas.
An. Husb. 10.
- N. Y. Woody Brush Control. To determine the best methods of application, volumes & concentrations to use, & effect of dormant treatment in brush poisoning with the selective hormone weed killers.
Cons. 96-E.

- Pa. The Control of Quackgrass, Wild Onion, Canada Thistle & Other Herbaceous Plants with Isopropyl N Phenyl Carbamate, 2,4-Dichlorophenoxyacetic Acid, & Other Herbicides. To determine effectiveness of IPC, 2,4-D & other herbicides on control of quackgrass, wild onion, Canada thistle, & other herbaceous plants.
Agron. 1095-B.
- Wyo. Effect of Big Sagebrush Control upon the Composition, Density & Production of Native Forage Species. To (1) determine effect of big sagebrush control upon density & composition of sagebrush-grass type rangeland; & (2) study effect of various amounts of sagebrush eradication upon production of native forage species.
Agron. 484. W-11.
- Miscellaneous Crops & Weeds
- Del. Weed Control with Herbicides. To (1) determine effect 2,4-D & other various herbicides on principal weeds & crop plants of Delaware, & (2) establish techniques for their use in weed control.
Agron. 256.
- Iowa Control of Weeds in Economic Crops. To (1) improve methods of controlling weeds by developing herbicides for use alone & in conjunction with other cultural practices & to adapt these methods to crop production techniques; (2) search for & test improved selected & general herbicides; (3) determine influence of environmental conditions on selective action of herbicides on major crops & weeds; (4) evaluate response of major crop varieties & breeding stocks to established herbicides such as 2,4-D; (5) determine most effective method of using more promising herbicides; i.e., time of application, preferred concentration & dosage, & site of application; (6) secure fundamental engineering information leading to development & improvement of equipment & methods for controlling weeds; & (7) study development of crops & weeds as influenced by the several factors of environment, weed control practices, & crop production methods.
Agron. 1121.
- Maine Chemical Weed Control in Maine Crops. To devise methods for the utilization of chemical herbicides for the control of weeds not readily controlled by ordinary cultural practices.
Agron. 14.

- Mo. Research in the Control of Weeds. I. Control of Weeds (Including Woody Plants) in Pastures & Meadows, and II. Control of Weeds in Corn, Cotton, Cereals & Soybeans. To reduce the damages to pastures, corn, cotton, cereals, & soybeans caused by weeds in their many & varied ill effects.
Field Crops 156.
- Mont. The Use of Herbicides for the Control & Eradication of Leafy Spurge & Poisonous Weeds. To develop more effective methods of controlling leafy spurge (Euphorbia esula) in cultivated & non-cultivated land, & study methods of controlling poisonous plants with herbicides.
Agron. 151, MS 952.
- Nebr. Eradication & Control of Weeds. To (1) establish principles & develop methods to eradicate or economically control annual, biennial & perennial weeds in fields, pastures, roadsides, irrigation ditches & lawns; (2) investigate new & old herbicides to supplement present knowledge of cultural & chemical weed control methods; (3) determine effects of weed control measures on yield & quality & germination of crops produced; (4) compare cultural & other weed control practices alone, chemical treatments alone, & combinations of these methods; & (5) study influence of environmental factors on results obtained from weed control measures.
Agron. 216.
- N. Y. Control of Nutgrass in Agricultural Regions. To control nutgrass with chemicals to make it possible to again grow row crops or to continue to grow them with less reduction in yields & less cost of weed control.
Veg. Crops. 29.
- N. Y. Chemical Control of Weeds Occurring in Field Crop Rotations & Permanent Pastures. To determine place of chemical weed killers in New Ycrk field crop rotations & best means of treatment involving time, rate, concentration & method of application.
Agron. 89.
- N. C. Weed Control in Sorghum, Corn, Tobacco, Small Grain, Horticultural Crops & the Specific Control of Bermuda Grass & Wild Garlic. To develop (1) field production practices to more efficiently control weeds in corn, sorghum, tobacco, small grains & horticultural crops & more efficient control methods for Bermuda grass & wild garlic; & (2) basic principles & practices involved in satisfactory farm use of above methods to learn facts needed to understand failures if & when they occur, & methods of preventing such failures.
Agron. 7.

- N. C. The Development of Principles & Practices for the Control of Weeds in Cotton, Peanuts, Soybeans, Forage Crops, Turf, & for the Control of Nut-Sedge, Johnson Grass & Woody Plants. To develop (1) for North Carolina reliable, practical & economical practices for solution of above weed problem, & (2) principles of weed control particularly as related to weed control practices in North Carolina.
Agron. 41.
- N. Dak. Control of Quackgrass, Field Bindweed, Leafy Spurge, Perennial Sow Thistle & Canada thistle by Means of Competitive Crops Supplemented by Selective Herbicides. To determine the ability of various grasses to suppress, control or eradicate serious perennial weeds of North Dakota.
Bot. 139.
- R. I. Evaluation of Chemicals & Other Means for Controlling Weeds. To determine (1) effectiveness of pre- & post-emergence treatments for weed control, & (2) fundamental effects of herbicides & other means on weeds & crops.
Agron. 27.
- Tex. Control of Field Bindweed, Blue Weed & Other Noxious Broad-leaf Perennial Weeds in Texas. To determine distribution & methods of dissemination & to develop effective & efficient methods of eradication & control. The objective of initial research in Texas will be to determine extent to which the most effective & efficient methods developed in other states are applicable to Texas conditions.
Agron. 686. S-18.
- Tex. The Utilization & Control of Johnson Grass in Texas. To (1) determine distribution, seriousness as a weed, & opportunities for effective use of Johnson grass in Texas; & (2) develop & evaluate more effective & economical practices of use & control, & coordinate such practices into efficient cropping systems adaptable to various agricultural situations in the state.
Agron. 794. S-18.
- Utah Control & Eradication of Weeds. To determine (1) effects of various crops in combination with different management practices & herbicides as related to crop yields & control of creeping perennial weeds; (2) effect of herbicides in control of annual weeds in small grains & certain other crops as related to crop yields & weed control; (3) duration of time that winter rye & wild oats seed will remain in soil & retain their viability & to devise methods for the control of rye in winter wheat & wild oats in small grain & other crops; (4) effects of various factors such as moisture, commercial fertilizer, organic matter, soil texture & salt on susceptibility of weeds to various herbicides; (5) if it is possible to devise a technique to replace weedy perennial vegetation with a more desirable type of vegetation on non-tillable land by the aid of herbicides, other devices & reseeding with desirable species; & (6) to continue present service, to college & station personnel, of spraying for control of noxious weeds on college & station property.
Agron. 159.

TAXONOMY, ECOLOGY & LIFE HISTORY OF WEEDS

- Idaho Studies on the Ecology & Propagation of St. Johnswort Insects in Idaho. To (1) determine if 3 recently introduced species of St. Johnswort feeding insects can become established in Idaho; (2) conduct ecological & life history studies on all introduced St. Johnswort feeding insects; & (3) determine role of each St. Johnswort insect in control of this weed in Idaho.
Ent. 162.
- Minn. Weed Studies. 1. Taxonomy of Weeds. 2. Ecology & Physiology of Weeds. 3. The Physiologic & Anatomic Effects of Herbicides on Weeds & Economic Crop Plants.
Pl. Path., Bot. 220.
- N. Mex. Ecology of Creosote Bush (*Larrea divaricata*) on Desert Grassland Range. To determine (1) influence of good & bad cover of perennial grasses on establishment of creosote bush; (2) influence of grazing by domestic livestock & range rodents, & competition by creosote bush on restoration of desirable forage grasses to deteriorated range; & (3) certain autecological & life history characteristics of creosote bush.
An. Husb. 32. W-25.
- N. Y. A Taxonomic Revision of the Genus *Chrysopsis* (Compositae). To (1) attempt to resolve current differences of opinion on speciation & nomenclature of genus *Chrysopsis*; (2) determine karyology (chromosome counts) of all species possible, & determine by cytotaxonomic methods possible relationship & origins of species of *Chrysopsis*; (3) collect & prepare adequate collections of herbarium material of various representatives of the genus; & (4) publish a taxonomic monograph of the genus *Chrysopsis*.
Hort. 107.
- Oreg. Ecology of Rabbitbrush (*Chrysothamnus* spp.) as a Basis for Control on Eastern Oregon Ranges. To obtain data pertinent to control of rabbitbrush on range lands of eastern Oregon.
Rge. Mgt. 160-8. W-11.

MACHINERY FOR WEED CONTROL

- La. Grass & Weed Control. To evaluate & improve machines & methods (1) for disposal of crop residues in mechanical cotton production, (2) for planting cotton in mechanical cotton production, (3) for control of weeds in mechanical cotton production; & (4) for preparing cotton crop for mechanized harvest.
Agr. Engin., Agron. 858. S-2.

Minn. Design & Development of Equipment & Methods for Weed Control. To (1) determine by lab or field tests factors which affect operating characteristics of machines or machine elements used in all methods of weed control; (2) design & develop new machines or machine elements or make design improvements in available equipment; (3) formulate recommendations on proper use of weed control equipment; & (4) conduct lab or field tests to determine performance of weed control equipment.

Agr. Engin. 1208.

Mo. Equipment & Procedures in Spraying for Control of Weeds & Brush. To (1) explore development & improvement of equipment & methods for use of chemicals in weed control in beans; (2) study possibilities of cooperation between rural electric co-operatives in brush control along rights-of-way to better appraise new equipment & methods of applying herbicides; & (3) study effect of concentration & volume of herbicides used on toxicity of materials to both crop & weed plants, for more information on costs & effectiveness of applications at various concentrations.

Field Crops 153.

N. Y. The Basic Requirements & Design Principles of Mechanical Equipment for Control of Insects, Diseases & Weeds. To study the requirements of mechanical equipment for pest control practices with the objective of determining basic information necessary to design new or to modify existing available equipment for practical use. To design & construct equipment for experimental use for the purpose of determining practical control measures & suitable machinery.

Agr. Engin. 14.

MISCELLANEOUS

Calif. Effects of Fumigants, Insecticides & Herbicides on Soil Productivity. Learn (1) influence of soil properties & various soil management practices on effectiveness of fumigants, insecticides & herbicides, & (2) effect of fumigants, insecticides & herbicides on chemical, physical & microbiological properties of soil with special reference to soil productivity.

Pl. Nutr. 1532.

REGIONAL PROJECTS

- W-11 The Control or Eradication of Weeds. To evaluate, improve, devise or discover means of controlling or eradicating weeds (undesirable plants) with maximum efficiency & minimum injury to associated plants, soils, animals & man. Problems included apply to field, fruit, vegetable & pasture crops on irrigated & non-irrigated land; to ranges, forests, drainage areas, irrigation & drainage ditches, rights-of-way, recreational, aquatic waste & other areas having weed problems.

Cooperating stations: Federal-grant projects - Arizona, California; Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Washington, Wyoming and Texas.

- S-18 Weed Control Investigations in the South. A. To study the mechanisms of herbicidal action in plants. 1. Chemical reactions. 2. Physiological responses. 3. Anatomical responses. B. To evaluate the effects of herbicides on plants & soils under varying environmental conditions. 1. Persistence & movement in soils. 2. Absorption & translocation in plants. C. To study biological factors affecting weeds. 1. Life histories. 2. Storage & translocation. 3. Competition factors. 4. Plant succession.

Cooperating stations: Federal-grant projects - Alabama, Arkansas, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, Tennessee, Texas, and Virginia.

- NE-12 Influence of Environmental Factors on the Effectiveness of Herbicides. 1. To determine the influence of several climatic & soil factors on the effectiveness of representative chemicals from among the major groups of chemicals now used as selective herbicides. 2. To determine physiological, chemical & other changes in plants induced by the use of these herbicides.

Cooperating stations: Federal-grant projects - Connecticut (Storrs), Delaware, Maryland, New Hampshire, New Jersey, New York (Cornell), Pennsylvania, Rhode Island, and West Virginia.

- NC-10 Eradication or Control of Weeds & Other Undesirable Plants. To devise or discover & improve means of eradicating or controlling undesired plant growth with maximum efficiency & minimum injury to associated plants, animals, & man. The areas involved are in field crops, vegetable crops, gardens, cultivated lands, pastures, lawns, cemeteries, recreational areas, roadsides, forests, rights-of-way, waste lands, drainage & irrigation ditches, ditch banks, ponds & other aquatic areas, & other locations where weeds are a problem.

Cooperating stations: Federal-grant projects - Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

LIST OF SUMMARIES OF FEDERAL GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

SESD-OD-1103 :		
Summary	Subject-Matter Area	Title of Summary
Number		
1	Agricultural Chemistry <u>2</u> /	Agricultural Chemistry
2	Agricultural Economics <u>2</u> /	a. Prices & Incomes & General Studies of Commodities or Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering <u>1</u> /	a. Land & Water Use & Development b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Industry <u>1</u> /	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry <u>1</u> /	Dairy Cattle
6	Dairy Technology <u>1</u> /	Dairy Technology
7	Entomology & Economic Zoology <u>1</u> /	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops <u>1</u> /	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology <u>1</u> /	Food Science & Technology (Secs. a, b and c)
10	Forage Crops, Pastures & Ranges <u>1</u> /	Forage Crops, Pastures & Ranges
11	Forestry <u>1</u> /	Forestry
12	Fruits & Nuts <u>2</u> /	Fruits & Nuts
13	Home Economics	<u>1</u> / a. Human Nutrition <u>1</u> / b. Housing <u>2</u> / c. Foods <u>2</u> / d. Household Economics & Equipment

1/ Summary Available

2/ Summary will be available by February 1, 1957

SESD-OD-1103 Summary Number	:	Subject Matter Area	:	Title of Summary
14		Economics of Marketing <u>2/</u>		a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15		Meteorology <u>1/</u>		Meteorology
16		Ornamental & Drug Plants <u>2/</u>		Ornamental & Drug Plants
17		Plant Pathology & Bacteriology <u>1/</u>		a. Plant Pathology & Botany b. Diseases of Field Crops c. Diseases of Fruit Crops
13		Plant Physiology & Nutrition <u>1/</u>		Plant Physiology & Nutrition
19		Poultry Industry <u>2/</u>		Poultry Industry
20		Rural Sociology <u>1/</u>		Rural Life Studies
21		Soils & Fertilizers <u>1/</u>		Soils & Fertilizers
22		Vegetables <u>1/</u>		a. Vegetable Crops b. Potatoes
23		Veterinary Science <u>1/</u>		Veterinary Science
24		Weeds <u>1/</u>		Weed Control

1/ Summary Available

2/ Summary will be available by February 1, 1957

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FEDERAL-GRANT RESEARCH
AT THE
STATE AGRICULTURAL EXPERIMENT STATIONS

May 1956

VEGETABLE CROPS

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State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture

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CURRENT SERIAL RECORDS

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' program is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC- North Central, NE - Northeastern, S - Southern and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the research is being conducted.

GENERAL *

Breeding

- Ala. Breeding of Certain Vegetables for Better Adaptation to Southern Conditions, With Particular Reference to Home and Market Garden Types. To develop in certain designated vegetables, home, market garden, and commercial, varieties which have resistance to diseases commonly troublesome in the South, and which are generally adapted to the soil and climatic conditions of this region. Vegetables will include tomatoes, peppers, lima beans, English peas, and Southern peas.
Hort. 412, USDA Reg. Veg. Br. Lab.
- Alaska Tomato and Cucumber Breeding. To produce a variety of tomato suitable for outdoor culture in Tanana Valley and a variety suitable for small greenhouses; and to produce a variety of cucumber suitable for outdoor culture in Tanana Valley and a variety suitable for small greenhouses.
Hort. 13
- Del. Breeding Vegetable Crops. To develop new varieties of vegetables which are better adapted to Delaware conditions, through cross-pollination and selection.
Hort. 48-H
- Iowa Improvement of Vegetable Crops for Canning Through Breeding. 1. Tomatoes--Use hybrid vigor to improve yields and quality; transfer morphological sterile character to varieties showing high combining ability; improve internal color; develop environmental and genetic cracking resistant lines; improve disease resistance; and determine effect of above factors on quality; 2. Lima Beans--develop large seeded high quality type resistant to heat conditions; and 3. Cucurbits--incorporate vine borer resistance of moschata species in maxima species, and develop lines with desirable maturity, shape, consistency and flesh color.
Hort., Bot., Pl. Path. 1106

* The Federal-grant projects active in May 1956 are listed but the project numbers are those in use in July, 1956. Projects on potato research are listed in a separate compilation.

Md.

Spontaneous and Induced Multiple Seedlings and Haploids of Zea Mays, Capsicum Frutescens and Other Economic Plants and Their Use in Plant Breeding. To (1) determine the frequencies and types in regard to number of members and chromosome numbers of spontaneous multiple seedlings and compare with the frequencies and types of multiple seedlings induced by X-rays or other agents; (2) determine by means of genetically marked stocks and direct microscopical examination, the origin of spontaneous and induced multiple seedlings and compare differences or similarities in the modes of development of spontaneous and induced polyembryony; (3) establish degree of genetic control of spontaneous polyembryony; (4) ascertain the frequency of haploids among induced multiple seedlings and compare with the frequency of haploids among naturally occurring multiple seedlings; (5) utilize haploids in the development of superior new varieties by doubling the chromosome number of the haploids, first to be carried out in the garden pepper and later extended to other plants; and (6) evaluate resulting homozygous lines in field performance.

Bot. F-15b, coop. Natl. Sci. Fdn.

Mass.

Breeding Sweet Corn, Peppers and Field Tomatoes for Massachusetts. Early types and varieties of sweet corn, peppers and field tomatoes will be developed that are adapted to the climatic conditions found in Massachusetts as well as sorts that may be resistant or immune to certain insects and diseases that prevail there.

Oler. 86

Mass.

Vegetable Breeding for Improvement of Quality and Adaptability. To (1) breed a New York type lettuce better adapted to Massachusetts conditions; (2) develop a Boston type lettuce of uniform nature and locally adapted; and (3) develop a cabbage with small green head that can be planted close and which will produce a yield comparable to Golden Acre, with quality similar to Danish Ballhead.

Oler. 88

Minn.

Vegetable Breeding. 1. Tomato Breeding, 2. Squash and Cucumber Breeding, 3. Variety Studies and Germ Plasm Maintenance of Vegetable Crops.

Hort. 2110

Minn.

Breeding Disease Resistant Vegetables. To (1) develop better varieties of muskmelons and watermelons and to work out improved breeding methods where feasible, (2) obtain selections of tomatoes resistant to mosaic, late blight and leaf diseases and to study plants and diseases in relations to each other.

Hort., Pl. Path. 2126

Minn.

Radiation as a Tool in Horticultural Crop Breeding.

(1) Study mutagenic effectiveness of radiations upon several fruit and vegetable plants with respect to dosage, conditions, and time of radiation, and in relation to periods of growth, dormancy, and rest periods of plants and seeds, (2) study effects of radiations on subsequent development of plants and seeds, (3) Produce mutations useful to fruit and vegetable breeders.

Pl. Path. 2127, coop. USDA

Nebr.

Improvement of Tomatoes, Sweet Potatoes, Cabbage, and Broccoli. 1. Tomato. To obtain varieties with improved horticultural characters such as earliness, stemless, disease resistance, etc., adapted to Nebr.; 2. Sweet Potatoes. To obtain through breeding varieties of sweet potatoes adapted for culture in home gardens or commercial plantings; 3. Cabbage and Broccoli. To develop through breeding varieties adapted to climatic conditions of Nebraska.

Hort. 467, coop. USDA

N. H.

Breeding Better Vegetables for New Hampshire. To develop new varieties of vegetables having superior qualities in one or more of these respects. Better adapted to the climate, higher in nutritive value, more productive, better appearance, and disease and insect resistant.

Hort., Chem., H. Econ. 54

N. Y.

(Cornell)

Cytogenetic Studies of Horticultural and Crop Plants.

To apply fundamental principles of cytology and genetics to development of new and improved varieties of horticultural and crop plants such as corn, iris, rye, canteloupes and Cattleya orchids and to eliminate defects of certain varieties such as partial sterility which are cytological in nature.

Bot., Pl. Brdg, Pl. Path. Flor. 77

N. Y.

(Cornell)

Breeding and Testing Crop Plants. A. Breeding Wheat, Oats, and Barley for Yield, Quality, Winter Hardiness, Disease Resistance, and Stiff Straw. B. Breeding Corn for Silage and Grain. C. Breeding Cabbage for Yield, Disease Resistance and Uniformity. J. Breeding Celery for Disease Resistance.

Agron. Pl. Path., Veg. Crops, Pl. Brdg., Ent.,
Ag. Eng., 116, coop. U. S. Plant Soil & Nut. Lab.

N. Y.
(State)

The Nature and Development of Resistance to Diseases of Canning Crop Vegetables. To (1) search for and develop any inherent resistance or tolerance that may be found to major diseases of canning crop vegetables; (2) study and determine factors affecting disease development in susceptible host to insure sound procedure in evaluation of breeding progenies from crosses with resistant lines and to determine nature of resistance; and (3) incorporate resistance into horticulturally desirable varieties.

Pl. Path. 7

Okla.

Improvement of Vegetable Crops, Breeding and Selection of Lima Beans, Snap Beans and Tomatoes. To determine (1) ascorbic acid, total and reducing sugars, and titratable acidity of various breeding lines and parent stock of tomatoes, and (2) the thiamine, riboflavin, ascorbic acid, and soluble and insoluble carbohydrate contents of various commercial varieties and breeding lines of lima beans.

Hort. Ag. Chem. 627-1

Pa.

Utilization of Hybrid Vigor in First Generation Progenies of Varietal Crosses of Solanaceous and Cucurbitous Crops, and Asparagus. To determine (1) extent to which hybrid vigor is manifested in the F_1 generation of certain vegetable crops; (2) feasibility of utilizing the F_1 hybrid vigor of certain vegetable strain crosses; and (3) methods and techniques of producing F_1 seed.

Hort. 1025

T. H.

Cucurbit and Legume Breeding. To improve disease resistance, market quality, yield and tolerance to agricultural chemicals of watermelons, cucumbers, muskmelons, pumpkins, squash, edible podded peas, pole and bush beans, and edible soybeans.

Veg. Crops. 814

T. H.

Improvement of Leafy Vegetable Crops, Lettuce, Cabbage (Head and Oriental), Cauliflower and Broccoli. (1) Obtain new varieties of above crops as meets changing needs of Hawaiian agriculture and markets. (2) Lettuce growers want a tipburn free, loose, butter leaf type variety with no preference for heads or non-heads in lowlands but 2-2-1/2# crisp leafy heads in uplands. Cabbage should have short core, uniform-ripening resistance to clubroot and mildews. Cauliflowers should mature from 75-80 days, good shaped and sized white curds, with protecting erect wrapper leaves, and heat resistance. Growers want heavy yield in center heads and side shoots of good market quality broccoli. (3) New varieties should resist diseases and insects and yield high in minerals and vitamins.

Veg. Crops. 815

T. H.

Root Crop Improvement. Develop heavy yielding, disease free, table quality clones of sweet potato, improved varieties of onion, both mild and pungent, carrots, true yams, *Dioscorea*, and (so-called) chop suey yams, *Pachyrrhizus*. Develop and study different strains of these, and make crosses designed to elucidate problems on inheritance of plant characters and resistances to insects and diseases, introduce and test white potato varieties suitable for crossing with occasional clones which have escaped from previous cultivation and are reputed to resist local diseases.

Hort., F. & N. 817

Tex.

Breeding Varieties of Green Beans, Southern Peas, Cabbage and Related Crops to Conditions in the Southwest. To secure by breeding and selection or through testing of introductions, high quality, productive and well adapted varieties of vegetables for Southwest; including for BEANS, 1. varieties resistant to high temperature and periods of drought, 2. must resist lodging following frequent heavy rains. 3. pods must be well above the ground and resistant to mildew. and 4. before release any variety or selection must be suitable for fresh market or processing or both; for SOUTHERN PEAS, 1. early, high yielding varieties of cream purple Hull, and blackeye peas, 2. selections must be upright, bushy type with pods well above foliage; 3. selections should mature at least 50% at one time to make possible mechanical harvest; 4. should be suitable for canning and freezing as well as fresh use; and 5. new selections should be resistant to nematode and wilt; for CABBAGE, 1. selections for cold hardiness, 2. uniformity of head, size, shape, color and maturity, 3. preferences for round types of 2-4 lbs.; and 4. lines that are vigorous in seedling stage; and for BROCCOLI, 1. selection for uniformity and early maturity, 2, green color with small buds, non-leafy-center head, and high production and 3. cold resistance.

Hort. 538

Varieties

Ala.

Variety, Culture, Improvement, and Storage Experiments With Vegetables. To (1) determine adaptability of varieties and strains of common vegetables; (2) locate, collect, test, improve, multiply and release superior local varieties, (3) determine influence of time and methods of seeding and planting on stand, maturity, and spoilage; (4) develop inexpensive storage methods for farm and city, (5) determine cooking, canning and freezing qualities of new varieties; and (6) develop means to provide seed of superior introductions for growers.

Hort. 105, coop. USDA

Ariz.

Seed Increase and Preliminary Evaluation of Plant Introductions That May be Suited to the Southwest. Provide for initial increase of seed of plants adapted to region, conduct preliminary evaluations of adaptability of new plants appearing suited to climatic conditions.

Hort., Pl. Path., Agron. 368 (W-6)

Ga.

The Testing of New Varieties and Selections of Vegetable Crops and Their Improvement Through Breeding. To test new varieties developed and introduced by private agencies and to work with the U. S. Vegetable Breeding Laboratory in the development of superior varieties for the home garden and commercial enterprises in the South.

Hort., Bot., 13, coop. USDA

Ga.

The Introduction, Testing, Multiplication and Preservation of New and Useful Plants of Potential Value for Industrial and Other Uses. To (1) cooperate with USDA, Southern Region and P. R. to obtain plant materials of potential value for industrial and other uses and as a source of new germ plasm for use in plant improvement, and (2) establish primary regional plant introduction station to catalog, multiply and preserve introduced and domestic seed and plant materials, and distribute them in the region.

Hort. Anim. Indus. Bot., Agron., 74 (S-9), coop. USDA

Idaho

Variety Testing of Fruits and Vegetables. To (1) test varieties of fruits and vegetables for adaptability to Idaho; (2) test yielding ability under Idaho conditions; (3) observe and note quality of fruits and vegetables, making organoleptic tests and other suitable tests; and (4) continue selections from existing seedling populations of apples and cherries originated at this station/

Hort. 219

Idaho

Testing and Evaluating Agronomic and Horticultural Crops for Idaho Agriculture. To (1) maintain contact with regional primary station at Pullman, Washington with respect to available plant materials which might be of value to Idaho agriculture; (2) secure promising material of above nature for evaluation under Idaho conditions; (3) evaluate materials for specific purposes and under conditions of a divergent nature peculiar to Idaho; (4) report any findings from tests to Regional Primary Station at Pullman; (5) coordinate important findings with breeding and testing programs extant in Idaho; and (6) develop new crops which might be found under this program.

Hort. 261 (W-6), coop. USDA

Iowa

The Introduction, Testing Multiplication, and Preservation of New and Useful Plants of Potential Value for Industrial and Agricultural Uses. To (1) cooperate with USDA and with the State Agricultural Experiment Stations in the North Central Region in a coordinated program of plant exploration and introduction to obtain materials of potential value for industrial and agricultural uses and as sources of new germ plasm for use in plant improvement; (2) maintain regional primary plant introduction station to catalog, multiply, evaluate, and preserve introduced and domestic seed and plant materials and to distribute seed and material to States wishing to study their value and ecological adaptation; (3) maintain and periodically publish an inventory of seed and plants grown at Primary Station and by secondary stations of the region; (4) prepare Breeders Stocks inventory of field and horticultural plants of economic value to States of North Central Region and assist the States in preserving, maintaining and distributing these stocks; and (5) establish regional accession record system and publish information on performance of new introductions and domestic accessions as reported by research workers.

Bot., Agron., Zool., Ent., Hort., For. 1018 (NC-7)
coop. USDA

Ky.

Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants and Plant Species for Industrial and Other Purposes, and for the Preservation of Valuable Germplasm of Economic Plants. To (1) introduce species and varieties of plants into Kentucky which are considered to have possible agricultural value; (2) multiply and evaluate introduced plants as new crops, as sources of new germplasm in crop improvement, and for possible new uses; (3) evaluate any native plants which may have potential value to Kentucky agriculture; and (4) preserve varieties and species of economic plants which have valuable germplasm.

Agron. 166 (S-9).

Minn.

Vegetable Breeding. 3. Variety Studies and Germplasm Maintenance of Vegetable Crops. To maintain and test those varieties and strains of vegetables that seem to have value to the public or may be useful in breeding work or may be utilized as educational material.

Hort. 2110-3

Mont.

The Adaptation of Vegetable Varieties and Their Culture. To determine (1) and develop adapted varieties of vegetables for Montana; and (2) most desirable cultural practices for vegetables under Montana conditions.

Hort. 62, MS 931

- N. H. Variety Tests of Fruits and Vegetables. To test and eventually make recommendations concerning new varieties of fruits and vegetables as they are introduced, particularly those which seem to have promise in this area in comparison with standard varieties.
Hort., H. Econ. 37, coop. USDA
- N. H. The Testing and Utilization of New Plant Materials in New Hampshire. To (1) study new plant materials introduced by plant explorers or others in a search for desirable new varieties or valuable germ plasm which may be used in breeding and (2) cooperative with other States in the region and with USDA by making findings known and providing propagation material if possible upon request.
Hort. 87 (NE-9)
- N. Mex. The Preliminary Testing and Evaluation of New Foreign and Native Plants of Potential Value for Oil, Protein, and Leguminous Forage. To (1) determine their adaptability, seed and/or forage yields, and other agronomic characteristics; (2) evaluate by chemical analysis seeds and other parts of new plants to determine their value as potential sources of oil, protein, and leguminous forage; and (3) maintain supplies of viable seed of the evaluated plants.
Agron. 43 (W-6)
- N.Y.
(State) Establishing a Plant Introduction Station and Maintaining Germ Plasm Plantings for Horticultural Materials at Geneva, N. Y. To (1) establish and maintain a primary regional plant introduction station with adequate facilities and personnel to handle introduced and domestic plant materials of potential value to the region; (2) cooperate with other States in the region, USDA and with other regions in a coordinated program to discover their value for plant improvement and (3) maintain and preserve valuable germ plasm of horticultural plants of economic value to the region, including strains or varieties resistant to cold, disease and insect pests, and stocks used in propagation of varieties.
New Crops 17 (NE-9), coop. USDA

Okla. Southern Vegetable Variety Trials. To (1) evaluate new vegetable varieties through southern region in a relatively short time; (2) standardize trial plantings; (3) coordinate data secured; and (4) reduce time and effort expended by each individual by cooperative work.
Hort. 597, coop. USDA Veg. Br. Lab.

P. R. Introduction and Evaluation of New Plants for Industrial and Other Purposes, and the Preservation of Valuable Germ Plasm of Economic Plants. To introduce economically important plants, evaluate them as sources of food and industrial use and as new germ plasm for crop improvement, and evaluate usefulness of some native species.
Pl. Brdg. 94 (S-9), coop. USDA

S. C. Investigations of New or Special Crops. (1) Ascertain adaptability and cultural requirements of new or special crops. (2) Evaluate in more extensive field tests new, domestic, or special crops. (3) Improve crops showing value for improvement by selection especially for disease and nematode resistance. (4) Cooperative with regional primary station (S-9 project) on evaluation and maintenance of genetic material. (5) Cooperate with Southern Regional Utilization Laboratory.
Hort., Bot., For., Chem. 88 (S-9)

T. H. Variety Tests of Truck Crops. To test the adaptability and market quality of varieties of vegetables when planted at different elevations and at different seasons throughout the year.
Veg. Crops. 809

Tex. Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants for Industrial and Other Purposes, and for the Preservation of Valuable Germ Plasm of Economic Plants. To (1) introduce species and ecotypes of plants into Texas which might have possible agricultural value; (2) evaluate introduced plants as new crops, as prospective sources of new germ plasm in crop improvement, for possible new uses; and (3) evaluate prospective usefulness of certain native species and forms appearing to be worthy of trial.
Agron., For., Hort., Flor. 717 (S-9), coop. USDA

Wash.

Vegetable Variety Investigations and Breeding of Major Truck Crops Adaptable to Washington Growing Conditions (Greenhouse Tomatoes). To (1) develop by breeding greenhouse tomatoes and selecting new varieties of vegetables that are suitable in yield and quality for fresh use and processing purposes as well as being adapted to one or more climatic areas of Washington; (2) test new varieties and strains in the important producing areas of Washington, including Columbia Basin; (3) obtain information on quality as related to climatic conditions as well as disease and insect resistance; and (4) conduct freezing and canning tests of new strains with cooperation of Fruit and Vegetable By-products and pilot labs.

Hort. 1129

Wash.

Contribution of the Washington Agricultural Experiment Station Towards the Operation of Primary Introduction Station, W-6. To outline and implement the responsibilities of the Washington Agricultural Experiment Stations relative to designation of Washington as location of Primary Plant Introduction Station for Western Region, (W-6), and to act as custodian of trust funds for other regional purposes.

Agron., Hort., For. Rge. Mgt., Pl. Path. 1134 (W-6)
coop. USDA

Wyo.

Testing Kinds and Varieties of Vegetables and Fruits in Wyoming. To (1) find disease resistant varieties of vegetables and fruits which will grow and produce high quality marketable yields in areas of different altitude in Wyoming; (2) test and evaluate new kinds and varieties of vegetables and fruits grown at a high elevation for adaptability, freezing and dehydro-freezing qualities; and (3) determine factors affecting quality and nutritive properties of processed vegetables.

Agron., H. Econ., Chem. 542

Culture

Ala.

Effects of Variations in Soil Moisture and of Different Lengths of Drought on Yield and Grade of Selected Vegetable Crops. To determine effect of (1) variations in range of soil moisture on yield and grade of vegetable crops; and (2) periods of drought of different durations at different times during life of vegetable crops on yield and grade of the crops.

Hort. 317

Alaska

Weed Control of Horticultural Crops. To determine which chemicals and cultural practices or combination thereof are best suited to control of weeds and their influence on productivity, winter survival, and quality of such crops as lettuce, cabbage, beets and strawberries.

Hort. 9

Ariz.

Sprinkler Irrigation Studies Under Arid Southwestern Conditions. To determine (1) combined losses from evaporation and drift with commercial type sprinkler heads; (2) losses by evaporation from wetted foliage and soil surface; (3) limiting rates of application and relation to fineness of spray on soils with low infiltration rates; (4) adequacy and uniformity of distribution as affected by interception by foliage in irrigation of citrus; and (5) to study other factors in the economics of sprinkler irrigation.

Hort., Ag. Eng. 303

Ariz.

Control of Weeds in Lettuce and Cantaloupes. To (1) screen and evaluate existing herbicides as well as those which may be developed during the time the project is in progress; and (2) make detailed evaluation of herbicides found to be effective as to rate of application, time of applications in relation to crop seeding and growth; concentration, and method of application.

Hort. 374, coop. USDA

Ark.

The Effect of Environment on the Performance of Vegetables. To determine effect of soil moisture, humidity and soil condition including exposure, depth, texture and humus content on germination, plant growth, fruiting and quality of vegetable crops.

Hort., For. 208

Ark.

A Study of the Effect of Fertilizers and Soil Treatments on the Production and Quality of Vegetables. To determine (1) most effective fertilizer and soil treatment for different vegetables and most economical methods of application of treatments; (2) effect of treatments on yield, grade, and quality of various crops; (3) plant and fruit characters under different treatments; (4) effect of treatments on maturity and ripening; (5) optimum condition and maturity for storage and market; (6) relation of weather conditions, and soil and air temperatures on plant yield and performance; and (7) reactions of plants to hydrogen ion concentration in soil and effect of different fertilizers on soil acidity.

Hort., For. 214

Ark.

Supplemental Irrigation Investigations With Horticultural Crops. To (1) study influence of varied water sources on soil condition and crop response with particular reference to sources with high salt content, and determine if such waters can safely be used under any conditions of horticultural production; (2) measure value of supplemental irrigation in terms of yield and quality of horticultural crops now generally produced in Arkansas; (3) determine if supplemental irrigation can be used in developing production of new horticultural crops in Arkansas; and (4) study possible changes that may be needed in management program of irrigated crops, such as planting dates, varieties and disease and insect control.

Hort., For. 310

Ark.

Determination of Effect of Insecticides on Plants and Soils, Including Bio-Assay of Residues. To determine bio-assay methods of determining insecticide residues on crops and in soil to evaluate effects of insecticides, solvents, diluents, and formulations on plant growth, harvest residues and after effects in the soil.

Ent. 370 (S-22)

Ark.

Studies of Physiological Factors That Influence Water Needs and Use in Production of Horticultural Crops. To (1) study methods of determining soil moisture in an attempt to find or develop a reliable and efficient technique for use in these studies and for grower use; (2) determine range of available soil moisture permitting optimum growth and fruiting of plants, and if this range varies for different stages of plant development; (3) determine relation between nutrient use and moisture ranges for horticultural crops and (4) study relation between temperature, optimum soil moisture range and frequency of water application.

Hort., For. 388

Calif.

Factors Affecting the Absorption of Minor Elements by the Leaves of Vegetable Plants. To (1) overcome some minor element deficiencies which cause a loss in crop production and a lowering of nutritional value of vegetables produced; and (2) find how to overcome the acidity or alkalinity of spray material and form of minor nutrient used in cases where these affect whether or not the nutrient can pass through the cuticle and through cells of the leaf into the conducting tissues.

Veg. Crops. 1591

Storrs
(Conn.)

Soil-Plant-Water Relationships of Vegetable Crops. To (1) formulate a practical system of predicting need for irrigation of vegetables, and indicate methods of using limited water efficiently; (2) identify critical growth periods in various vegetables when irrigation or lack of it may be beneficial or detrimental; (3) ascertain influence of specific elements in humid climate on use of water by vegetables; (4) note effect of irrigation on vegetable quality at harvest and during storage; and (5) explain differential response of vegetables to varying levels of irrigation in terms of plant physiological processes and soil physics phenomena.

Soils 224

Conn.

Green Manure Crops for the Improvement and Maintenance of Physical Properties of Vegetable Soils. To study effect of various green manure crops on the improvement and maintenance of soil physical properties as related to increased vegetable production.

Soils 722

Del.

Weed Control With Herbicides. To (1) determine effect 2,4-dichlorophenoxyacetic acid and various other herbicides on principal weeds and crop plants of Delaware and (2) establish techniques for their use in weed control.

Agron., Ag. Eng., Hort. 11-H

Del.

Irrigation of Vegetable Crops. To (1) learn effect of irrigation on yield and quality of important vegetable crops when water is applied at various levels of soil moisture depletion and different physiological stages of plant growth; (2) investigate interactions between irrigation and other cultural practices, emphasizing nutrient supplying practices, control of plant diseases, and chemical applications for weed control; (3) formulate practical method for irrigation program by using soil moisture measurements, weather records, consumptive use data and rooting depth measurements.

Hort., Agron., Pl. Path. 52-H (NE-22)

Ga.

Mechanized Farming. To develop a crop rotation system that will utilize more efficiently farm machinery and labor throughout the year, to determine the adaptability of machinery now available and new machinery as introduced, and to study the cost and labor requirement for the production of field and vegetable crops with machinery.

Ag. Eng., Agron. 41

Ga.

Interrelation Between Irrigation, Fertilizer, and Soil Fumigation With Spring and Summer Horticultural Crops. Learn effect of irrigation and hormone sprays when used singly and in combination in production of fall grown tomatoes and effect of irrigation and soil fumigation when used singly and in combination on yield of tomatoes, sweet potatoes and strawberries. Measure effect of frequency and amount of irrigation water used and interrelationship of these to rate of fertilization on yields of tomatoes and sweet potatoes.

Hort., Nemo., Pl. Path., Ag. Eng. 110

Idaho

Factors Affecting the Yield and Quality of Vegetable Canning and Freezing Crops in Idaho. To (1) determine effects of nutrition, irrigation, etc., on fruiting and yielding of tomatoes, sweet corn, and lima beans; (2) study the relationship of these factors to quality of the product; and (3) determine reasons for and control of poor stands of plants, particularly the lima bean.

Hort., Ag. Eng., 213, coop. USDA

Idaho

A Study of Cultural and Other Factors Affecting Seed Yield and Seed Quality of Carrots, Turnips, Radishes, and Minor Seed Crops. The work will include uniform plantings, harvestings, replicated plots and plants, germination tests, etc. to (1) make maturity studies to determine effect of harvest date or seed maturity upon yield and germination of carrot seed, (2) determine best spring planting dates for carrot seedlings to avoid storage losses and obtain best stands, (3) determine role of apical dominance in carrot seed production, (4) study causes and control of poor germination of carrot seed, (5) determine methods of preventing winter injury and loss of stands of turnip and rutabaga roots planted for seed production, and (6) study best methods and practices for production of other vegetable seed crops.

Hort. 233

Ill.

Nitrogen, Phosphorus and Potassium Requirements of Vegetable Crops. To (1) establish correlations between response of vegetable crops to N, & P, and potassium fertilizers and soil tests for these elements usable as a basis of fertilizer recommendations; and (2) investigate physiological and morphological bases for variations in fertility requirements of vegetable crops.

Hort. 65-344

Ind.

The Physiology of Flowering and Fruiting of Selected Plants. To (1) determine nature of physiological processes responsible for flower initiation; (2) determine nature of physiological processes responsible for fruit development; and (3) apply these findings to horticultural crops.

Hort. 662

Iowa

Cultural Studies With Canning Crops. To (1) study rates and methods of fertilizer applications; (2) determine most efficient rotation for canning crops, (3) evaluate different methods and rates of planting; (4) determine most efficient methods and amount of cultivation for row crops; (5) study effects of fungicides on control of leaf defoliating diseases of tomatoes; (6) secure information on effects of growth substances on blossom drop as influenced by environmental conditions and variety; and (7) determine effects of above objectives on quality of canning crops.

Hort., Bot., Agron. 1105

Ky.

Determination of the Efficiency of Late Fertilizer and Foliage Application of Urea and Sugar on Lima Beans and Potatoes by Use of the Tissue Tests. To determine (1) if the need for nitrogen late in the season can be met by foliage applications of urea; (2) levels of nitrogen and phosphorus needed by lima beans and most effective ways of obtaining these levels; and (3) effect of foliage applications of sugar on quality and yield of lima beans and potatoes.

Hort. 553

Md.

Engineering, Soil, and Plant Aspects of Supplemental Irrigation. To determine (1) N retention in soil and its availability to plants as related to various irrigation and fertilizer practices; (2) interrelationships of crop species, rooting habit and certain cultural practices to yield and quality of agronomic crops as influenced by irrigation; (3) effects of irrigation on yield and quality of selected vegetable crops of importance in Maryland and the region; (4) interrelationships of supplemental irrigation, fertilizer, and other cultural practices in their effects on yield, quality and mineral nutrient content of vegetable crops, (5) rate of use of soil moisture by vegetable crops at various stages of growth and under varying climatic conditions; and (6) effects of frequency of irrigation, amount of water, starting time of irrigation and distribution methods with specific reference to first 5 objectives.

Hort., Agron., Eng. BOQR-83 (NE-22)

Mass.

Weed Control in Vegetable Crops. To develop more efficient methods for the control of weeds in vegetable crops through the use of various herbicides and/or mechanical means.

Oler. 87

Me.

Chemical Weed Control in Maine Crops. To devise methods for the utilization of chemical herbicides for the control of weeds not readily controlled by ordinary cultural practices.

Agron. 14

Me.

Cultural and Adaptability Studies With Maine Vegetables and Small Fruits. To (1) determine nutritional needs of these crops and evaluate methods of applying nutrients to obtain optimum yields of high quality produce; (2) determine importance and value of other cultural practices in production and handling, such as seedbed preparation, rotations, cover cropping, planting dates, trellising, mulching, irrigation, etc.; (3) evaluate varieties, hybrids and breeding stocks for breeding projects, commercial production and home gardening; and (4) develop better varieties of vegetables and small fruits for use in Maine.

Hort. 24

Me.

Effect of Fertilizers, Liming, and Cultural Treatments on Crops for Processing. To (1) further study amounts and ratios of fertilizer needed to produce large yields of high quality processing crops; (2) further study amounts of liming materials needed to maintain given pH and calcium levels in soil, without increasing incidence of potato scab, and effect of these different levels on yields; (3) determine most efficient placement of small amounts of lime and effect on yields; (4) study most efficient placement of fertilizer and proper time of application in rotation; (5) determine best seeding rates for peas, sweet corn, and beans, and proper spacing of broccoli plants commensurate with highest yields of processing materials; (6) study effects of side-dressing applications with N at various times upon growth and quality of beans, sweet corn, and broccoli; (7) study and improve planting, cultivation, and harvesting practices for processing crops; (8) determine adaptability of new varieties for processing in Maine; (9) study effects of growth regulators and nutrient sprays on maturation and fruit-setting in beans and peas; (10) evaluate effect of harvest date on yield and quality of beans and peas; (11) determine if early removal of primary head of broccoli can be done without reducing yield; and (12) study effect of field freezing on broccoli quality.

Hort., Agron. 74

Mich.

Frost Control on Vegetation by Convected Heat. Infra-Red Radiation, and Air Movement. To (1) investigate all possibilities of generating infra-red which would be adaptable to frost control, and develop methods and equipment entailing lowest manufacturing costs, using liquid fuels, and using LP gas; and (2) investigate possibility of using helicopter rotor as a method of brining warm upper air down on the crop, with added heat.

Ag. Eng. 6-A

Mich.

The Use of Several Tillage Methods for the Preparation of Seed Beds for General Agricultural Crops. The effect of various methods of seed bed preparation on the resulting agricultural crops as to yield and quality will be studied. Observations will be made of the effect on the physical properties of the soil.

Soil Sci. 7

Mich.

Control of Flowering and Fruiting in Vegetable Crops. Define environmental conditions which control flower formation and development. Evaluate reproductive and vegetative responses to chemical treatment. Promote earlier flowering and fruiting through chemical treatment and controlled environment and develop practical basis for these methods in commercial production. Study biochemical and morphological aspects of flowering.

Hort., Pl. Phys. 89

Mich.

Water Requirements of Crops. To determine (1) use of water by crops, as influenced by climate, soils and farming practices; (2) basic relationships between soil moisture and crop production; (3) optimum growth conditions for crops under various irrigation, fertilizer and management practices; and (4) proper irrigation equipment design principles and operational practices as affected by peak moisture use; crop rooting habits, fertilizer practices and other design factors.

Ag. Eng. Hort., Farm Crops, Soil Sci., 805

Minn.

Weed Control in Vegetable Crops. To improve quality and to reduce production costs of vegetables grown for processing with special emphasis on weed control.

Hort. 2125

Miss.

Correlating Soil Test With Vegetable Crop Growth and Yield Response to Added Fertilizers. To learn influence of various P & K applications on yield in different soil types of various known fertility levels prior to treatment so that a plant response - soil fertility relationship will be used as a basis for fertilizer recommendations.

Soils Fert. HZ-1

Miss.

A Study of the Influence of Small Grains as Winter Green Manure Crops on the Growth, Quality, and Yield of Vegetable Crops. (1) Learn value of small grains as winter green manure crops on; yields and quality of vegetables, increasing organic matter, losses of plant food by leaching occurrence of weeds and non-desirable grasses. (2) Compare results obtained from plots planted to small grain to ones using animal manure, and to bare plots. (3) Learn influence of small grains on amount, kind, and time of application of commercial fertilizers for maximum yields.

Truck Crops HZ-3

Mo.

The Use of Water In the Production of Agricultural Crops. To (1) determine physiological effects of application of water to different species of plants at different stages in their growth; (2) develop reliable criteria for determining when various species will benefit from water; (3) study response of different varieties to particular levels of available soil moisture; (4) determine possibility of lowering rate of transportation of various crops; (5) determine influence of fertility level on yield and quality of crops grown under various soil moisture levels; (6) determine optimum rate and amount of water application for various soils to be irrigated; (7) determine effect of irrigation on physical and chemical characteristics of various soils; (8) study changes in management practices, such as disease and insect control, made necessary by use of additional water in crop production; (9) determine present sources of water and develop design data for surface reservoirs as source of irrigation water; (10) adapt existing methods and develop better ones for irrigating under humid conditions, (11) integrate use of irrigated pastures into livestock production; and (12) make case studies with farmer cooperators on costs and benefits of irrigation.

Hort., Ag. Eng. 1

Mo.

Commercial Culture of Truck Crops and Greenhouse Vegetables. a. Supplemental Irrigation of Vegetable Crops in Southeast Missouri. b. The Detection and Correction of "Salting-Out" of Vegetable Greenhouse Soils. c. Lima Bean Culture. d. Improvement of Commercial Sweet Potato Production. e. Cultural Practices for the Processing Tomato Crop in Southwest Missouri. g. Cultural Practices to Improve Irish Potato Yields and Storage Keeping Quality.

Hort 121

Mo. Physiological Mechanisms of Reproduction of Horticultural Plants. To (1) make intensive investigations and evaluation of effects of major antiauxins and one or two best known auxins on flower bud initiation and development of tomatoes, beans, peas, and possibly other horticultural plants, and secure desirable set and yield of fruit after flower bud initiation and development has been achieved; and (2) determine effect of various synthetic plant growth regulators on fruit set, size, and quality.

Hort. 129

Mo. Research in Control of Weeds-- a. Control of Weeds in Horticultural Crops. To (1) determine effectiveness of presently reported herbicides; (2) devise methods of using herbicidal properties of these chemicals; (3) find selective herbicides suitable for use in 2, 4-D susceptible crops; (4) measure effect of herbicides on yields; and (5) determine effectiveness of various mulching materials in weed suppression.

Hort. 146

Mo. Nutrition of Vegetable Crops--a. Response of Vegetables to Established Cationic Saturation Levels on Low Exchange Soils. To (1) continue investigation of comparative yield response of several vegetables on Lintonia fine sandy loam the exchange complex of which is differentially saturated with respect to cations Ca, Mg, K and H; (2) determine extent to which soil amendments applied last year have changed relative cationic saturation of exchange complex on Lintonia fine sandy loam; and (3) establish more definitely the relationship between exchangeable potash at concentrations over 300#/A and response of certain vegetable crops on calcium-laden river bottom soils.

Hort. 196

Mont. Fertilizing Vegetable Transplants. To determine (1) fertilizer influences in the growing of the transplants; (2) influence of various types of starter solutions upon transplants grown with varying fertilizer treatments; and (3) effect of transplant fertilization on the field fertilizer program.

Hort. 38 MS 532

N. H. Cultural Studies With Horticultural Crops. To determine best cultural practices for fruits, vegetables, and flowers, including fertilizers, soil amendments, insect control, disease control, planting dates, methods, depths and distances, cultivation practices, and weed control.

Hort. 39

N. H.

Temperature Relations in Horticultural Plants Under New Hampshire Conditions. To determine effect of (1) various pigments and plants and metal reflectors on winter hardiness of fruit trees, (2) mulches on soil temperature around roots of horticultural plants, and (3) uniformly low temperature on winter hardiness of such plants; (4) to determine importance of obtaining temperature records on favorable sites; and (5) maintain a base station for recording climatological data.

Hort. 40

N. H.

Nutritional Studies With Horticultural Plants. To (1) determine causes and prevention of leaf scorch; (2) study effect of animal manures on leaf scorch and nutrition, and of (3) organic compounds of mineral nutrients as compared with inorganic forms on leaf scorch and plant response in general; (4) determine factors causing mineral deficiencies and (5) effect of mulches on mineral nutrition.

Hort. 41

N. J.

Effects of Plant Environment on Vegetables in New Jersey. To learn (1) needs among different varieties of vegetable crops in chemical and physical environment for best growth, yield and quality of product, (2) yield for various crops grown on irrigated vegetable fertility plots, (3) effects of use of nitrified materials as sidedresser (4) more about timing of irrigation by measurement.

Pl. Phys. , Ent. 340

N.Y.
(Cornell)

Methods to Improve Design and Utilization of Sprinkler Irrigation Systems. Learn (1 & 2) consumptive use of water by various vegetable, field, and pasture crops; simple method for scheduling irrigation. (3) increase efficiency of sprinkler irrigation system.

Ag. Eng. Veg. Crops. Agron. 39 (NE-22)
coop. USDA

N. Y.
(Cornell)

Development of Improved Methods and Equipment for Tillage, Seeding and Fertilizer Placement. To develop improved methods and equipment for seed bed preparation, and seed and fertilizer placement for vegetable and forage crops in State.

Ag. Eng. Agron. 40, coop. USDA

N. Y.
(Cornell)

Fertilizer and Soil Management Studies With Market Vegetables and Dry Beans. To study methods of maintaining high yields of market vegetables in intensively cropped areas of N. Y. and to determine best methods of fertilization and soil management for dry beans for the wide range of soil types on which they are grown.

Veg. Crops. 168

N. Y.
(State)

The Market Quality, Including Physical and Chemical Measurements in Relation to Maturity and Yield of Vegetable Crops Grown for Processing. To investigate (1) returns from peas when harvested at different stages of maturity; (2) relation between heat units accumulated during the growing period and tenderometer reading; and (3) yields and net returns from tomatoes harvested at the immature stage for green-wraps as compared with the red-ripe stage for canning. To obtain information on the relation between increasing rates of seeding to obtain increased yields of small beets and determine optimum seeding rate to produce largest net returns.

Veg. Crops, Food Sci. & Tech. 4

N.C.

Weed Control in Corn, Sorghum, Tobacco, Small Grain, Horticultural Crops, and the Specific Control of Bermuda Grass and Wild Garlic. To develop (1) field production practices to more efficiently control weeds in corn, sorghum, tobacco, small grain, and horticultural crops, and more efficient control methods for Bermuda grass and wild garlic; and (2) basic principles and practices involved in satisfactory farm use of above methods, to learn facts needed to understand failures if and when they occur, and methods of preventing such failures.

Agron. 7

N. C.

Factors Influencing Crop Stands. To study the influence of (1) certain preplanting environmental factors upon seed viability, and the vigor and general growth of resulting seedlings; and (2) soil environmental factors upon seed germination and seedling development.

Agron., Pl. Path., Ent., Ag. Eng. 42

N.C. The Effect of Potassium and Nitrogen Supply on the Growth and Development of Vegetable Crops. (1) Learn effect of anions and other exchangeable cations on leaching losses and fixation of K in soils and on uptake and utilization of K by plants, (2) ascertain influence of N and K supply on development of desirable plant parts during ontogeny with emphasis placed on sweet potato root enlargement, (3) learn correct time, placement and source of N and K for maximum vegetable production.

Soils 122

Ohio Eradication or Control of Weeds and Other Undesired Plants.--II, Chemical and Cultural Weed Control Studies with Horticultural Crops. To determine (1) if any available weed control chemicals can be used in conjunction with regular cultural practices to solve some major weed problems associated with production of horticultural crops; (2) kind of chemical best suited for use with a specific crop; (3) optimum form of chemical, time, rate and method of application for each crop under field conditions; and (4) through replicated field plot experiments, the value of these treatments with regard to weed control, and their effect on qualitative and quantitative yields of the crop plant.

Hort. 71-2 (NC-10)

Okla. Improvement of Vegetable Crops.
Hort., Ag. Chem. 627

Pa. Interrelations Among Varieties, Fertilizing Treatments, Spacings and Locations of Tomatoes, Peas, Beans and Sweet Corn. To determine (1) adaptation of various varieties to soil and climatic conditions of canning areas; (2) efficiency of various methods of applying fertilizers; (3) most feasible spacing distances; and (4) relationships between and among varieties.

Pa. Hort. 1023, coop. Com. Canneries of Pa.

Pa. Irrigation of Crops in Pennsylvania. A. The Relation of Irrigation to Soil Improvement in Vegetable Crop Production. To determine (1) value of irrigation for vegetable crop production on soil well tilled and fertilized; (2) value of irrigation for maximum production of organic matter from green manure crops used in rotation; and (3) effect of irrigation on physical condition of soil.

Hort. 1152-A

S. C.

Boron Fertilization in Relation to Yield and Quality of Crops. To (1) determine most suitable forms and rates of boron to add to general mixed fertilizers so they will supply boron needs of most crops without harmful effect on more sensitive plants; (2) availability of boron compounds to plants and residual effect on soil of major soil series; (3) evaluate effect of boron on yield and quality of crops; and (4) study effect of boron on absorption of other nutrients by plants.

Agron. 13

S. D.

Modification of Wind and Temperature to Improve Vegetable Yields and Quality. To (1) develop methods for decreasing wind velocity in fields of vegetable crops; (2) study changes in other environmental factors occurring as a result of decreased wind velocity, such as air temperature, air humidity, soil temperature, and soil moisture; and (3) determine value of protecting from low temperature, and wind in the field from such structures as cloches, cold frames, etc.

Hort. 118

Tex.

Supplemental Irrigation in East Texas. To determine (1) efficient methods of pumping, conveying, and applying water for supplemental irrigation in East Texas; (2) water intake rate of irrigated soils in East Texas and develop water application methods to prevent ponding and run-off; (3) optimum soil moisture and fertility levels of various soils for cotton, vegetables, forage crops, sorghum, corn and other crops at various stages of growth; and (4) interaction between soil moisture and fertility levels so fertility amendments and water applications may be more efficiently used by growing crops.

Agron., Ag. Eng., Hort. 842 (S-24)

Tex.

The Influence of Mineral Nutrition, Irrigation and Variety on the Nutrient Uptake and Metabolism of Cool and Warm Season Vegetable Crops. Learn (1) effect of various levels of macro and micro nutrients on metabolism of plants with emphasis on uptake and utilization of S and mg. (2) interaction between irrigation and mineral nutrition on cool and warm season crops, (3) differential variety response to macro and micro elements with and without supplemental irrigation.

Hort., Agron. 1044

- Utah Vegetable Seed Production Studies. Learn best cultural practices for production of seed in State of peas, carrots, and other vegetables.
Hort. Ag. Eng. 343, coop. USDA
- Utah Culture of Tomatoes and Lima Beans. To determine (1) best irrigation and fertilizer practices for tomatoes and lima beans; (2) influence of plant pruning on yield of tomatoes; (3) influence of sucrose sprays on survival of tomato transplants; and (4) effect of row spacing and planting time on yield of lima beans.
Hort., Agron., Veg. Crops. 384
- Wash. The Effects of Sprinkler Irrigation on Plant Growth, Fruit Set, Shape of Produce, Malformation, and Maturity of Certain Vegetable Crops. To study the type of sprinkler head best suited to garden farming, the rate of water flow, the effect of and on water percolation. To determine the effects of over-head watering on plant growth and production as compared with rill irrigation.
Hort. 799
- Wis. Relation of Plant Character, Composition, and Anatomy to Growth, Blossoming and Fruitfulness. To determine (1) if flowering of plants under widely different environmental conditions is due to a common physiological condition within plants or does each plant represent a specific reproductive type; and (2) nature of blossoming stimulus.
Hort.
- Wis. Production of Vegetable Crops and Small Fruits Under Supplemental Irrigation. To (1) determine response of vegetable crops and small fruits to supplemental water; and (2) devise cultural practices with vegetable crops and small fruits which will give maximum returns in yield and quality under supplemental irrigation.
Hort. 913

Harvesting and Storage

- Ariz. Factors Affecting the Shipping Quality and Consumer Acceptability of Arizona Grown Vegetables--
A. Lettuce Shipping Quality and Consumer Acceptability as Affected by Varieties, Growing Conditions and Packing.
B. Melon Shipping Quality and Consumer Acceptability as Affected by Varieties, Growing Conditions and Packing.
C. Carrot Shipping Quality and Consumer Acceptability as Affected by Growing Conditions and Packing.
Pl. Path., Nutr., Hort., Home Econ. 308
coop. USDA
- Calif. Development of Mechanical Harvesting and Field Handling of Deciduous Tree Fruits, Nuts, Grapes, Olives, Berries, and Vegetables. To (1) reduce labor requirements and unit costs of harvesting tree and vine crops through design and development of mechanical equipment and improved handling techniques; and (2) maintain quality of final product under a revised harvesting system.
Ag. Eng., Pom., Viti. 1551
- Calif. Time and Motion Studies of Vegetable Harvesting in Relation to New Techniques in Large Scale Production. To (1) develop new and better methods of performing vegetable work by eliminating unessential operations; (2) develop equipment to reduce work in vegetable operations; and (3) obtain ideas as to how methods may be improved by dealing with time intervals required for different operations.
Ag. Eng., Veg. Crops 1592
- Calif. Losses in Vegetables During Marketing as Influenced by Harvest Conditions and Post Harvest Handling Procedures. To learn effect of following on deterioration; composition and stage of maturity at harvest; temperature, during harvesting, handling, and market distribution; post-harvest use of fungicides, insecticides, and protective materials; physical methods of harvesting and handling. Indicate changes in marketing procedures to improve attractiveness, quality and food value and expand market for vegetables.
Veg. Crops, Ag. Econ., Home Econ. 1653

- Calif. Basic Requirements and Design Principles of Mechanical Equipment for the Production and Handling of Vegetable Crops. Reduce cost of producing vegetable crops in southern California without decrease in quality and grade.
Ag. Eng., Veg. Crops 1674
- Del. Chemical Changes That Occur in the Pectins of Fruits and Vegetables in "Fresh Market" Channels. To (1) establish chemical changes which occur from time fruits and vegetables are harvested until sold, (2) establish a physico-chemical basis for the changes in quality which occur during marketing, (3) develop practical measurements and means of preserving quality in fruits and vegetables following harvest.
Chem. 27-C
- Mass. The Role of Cooling Methods, Chemical Washer, and PrePackaging in Improving the Quality of Fresh Fruits and Vegetables. To improve present marketing practices and quality of New England fresh fruits and vegetables by application of technological advances in cooling methods, chemical washes, and prepackaging, studying blueberries, cranberries, raspberries, strawberries, peaches, grapes, asparagus, green beans, peas, corn, onions, celery, potatoes, lettuce and spinach.
Food Tech. 68
- Mass. The Study of Various Practices Used in Harvesting, Handling and Marketing Certain Native Vegetables as They Relate to Post Harvest Length of Life, Quality and Consumer Acceptance. To develop more efficient methods of maintaining peak harvest quality and to reduce spoilage during handling and marketing of locally grown vegetables.
Oler. 90

Mich.

Post-Harvest Physical and Chemical Changes in Fruits and Vegetables in Relation to Quality. I. Pre-Harvest Treatment, Harvesting and Curing Practices on Storage and Market Quality of Onions.--- II. Nature, Measurement and Control of Substances Causing Bitterness in Carrots, Celery, and Lettuce.---III. Enzyme Relationships and Biochemical Changes Associated With the Rapid Post-Harvest Deterioration of Strawberries, Muskmelons, Peaches and Asparagus. 1. To ascertain effects of maturity, preharvest chemical treatments, topping methods, and curing temperatures on such quality factors as firmness, water loss and dry matter content of onion bulbs and on the color, thickness, and tightness of the outer scales; II. To learn chemical constitution of principle or compound causing bitterness and devise methods for its deterioration, and measure quantitatively the effect of various handling and storage treatments on occurrence, development or disappearance; and III. To determine nature of enzymatic and biochemical changes associated with flesh softening of strawberries, and peaches, internal breakdown of muskmelons and darkening and subsequent breakdown of stored or packaged asparagus; and evaluate physical and chemical treatments to retard these disorders.

Hort., Chem., Ag. Econ., Engr., Soils. 68

N. Y.
(Cornell)

The Effects of Methods of Post-Harvest Handling Vegetables, Especially Prepackaging, Chemical Treatments and Storage on Quality and Consumer Acceptance. Improve methods of prepackaging and storing vegetables and to develop an apparatus for rapid objective measurement of of flavor of such vegetables.

Ag. Econ., Hort. 163-3 (NEM-18), coop. USDA

Ohio

Modified Atmosphere Holding and Storage of Vegetables. To (1) determine optimum concentrations of oxygen and carbon dioxide in which to hold or store highly perishable vegetables, and (2) follow changes in sugar content, ascorbic acid, respiration, weight and appearance of stored products.

Hort. 48

Ohio

Respiration and Associated Factors as Indices in the Determination of the Period of Marketability (Shelf-Life) of Fresh (Unprocessed) Fruits and Vegetables---
To determine (1) the rate of respiration and weight loss of fresh fruits and vegetables under the conditions normally encountered in retail and wholesale distribution; (2) optimum conditions for storing and handling fresh fruits and vegetables through the study of various packages and controlled temperature and humidity ranges; (3) maximum holding period for fruits and vegetables under various controlled conditions; (4) through chemical analysis the changes which occur in fresh fruits and vegetables during the holding period in relation to reducing sugars, total sugars, fiber, or other measureable material changes; and (5) effect of the source of fresh fruits and vegetables (information on growing environmental and early post-harvest handling) on the respiration rate and quality of these fresh fruits and vegetables.
Hort., Ag. Econ. 60

T. H.

Factors Affecting the Keeping Quality of Cut Flowers, Foliages, Ornamentals, Fruits, and Vegetables in Relation to Quarantine Sterilization Requirements for Export. To (1) determine what factors, pre- and post harvest, contribute to keeping quality of Hawaiian grown cut flowers, foliages and other ornamentals, fruits and vegetables in relation to shipment and marketability following quarantine sterilization, and (2) develop best methods of maintaining or improving keeping quality and marketability of these plants under treatments found necessary to destroy insect larvae and eggs which might contaminate them.
Pl. Phys. 660

T. H.

Studies on Post-Harvest Physiology of Hawaiian Grown Fruits, Vegetables and Ornamentals as Applied to Quality Storage Life and Marketability. Investigate basic requirements of harvesting, transporting, handling, and storage necessary to assure high quality and marketability of various plant commodities from various areas.
Pl. Physiol. 663

Processing and Utilization

- Ark. Studies of Factors That Influence the Preservation of Desirable Qualities in Quick Frozen Fruits and Vegetables. To (1) study and develop objective tests and establish objective criteria for judging suitability of fruits and vegetables for preservation by freezing with respect to varietal characters and to maturity; (2) develop treatments to improve table quality of fruits and vegetables preserved by freezing; and (3) evaluate recently developed lines of fruits and vegetables for preservation by freezing.
Hort., For. 255
- Ark. The Effects of Wide Variations in Soils and Weather Conditions on the Nutritive Value of Vegetables. To determine the conditions which influence the rate of uptake of phosphorus and calcium and the storage of vitamins in vegetables, i.e., the effect of (1) high and low levels of nutrients, (2) varying the ratio of phosphorus and calcium to other nutrients, (3) organic matter in the soil, (4) soil moisture, and (5) season of growth; and the most economical and satisfactory method of growing vegetables high in phosphorus and calcium and or vitamin content.
Hort., For. 281
- Calif. Economic Factors in Plant Location and Organization For Freezing Western Fruits and Vegetables. To (1) determine physical and economic relationships in assembly of product and operation of freezing plants for western fruits and vegetables; (2) indicate how variations in methods and organization affect costs and efficiency; (3) study effect of number and type of products handled by single plant on costs; (4) indicate effects of scale of operations and plant location on costs.
Ag. Econ. 1571
- Colo. Properties and Processing of Colorado Fruits and Vegetables. To study composition, nutritive values and related chemical, physical and organoleptic properties, and the modifications of these characteristics arising from variations in the sample.
Home, Econ. 90, coop. USDA, Dept. of Defense
- Colo. Isolation and Identification of the Polyphenols of Crop Plants and a Study of Their Properties and Biochemical Function. To (1) quantitatively estimate polyphenolic constituents of crop plants with reference to plant parts used for food; (2) separate and identify principal polyphenols of specific plant species and varieties; (3) study and consider properties of polyphenols separated and identified; and (4) establish various biochemical functions for polyphenols isolated.
Bot., Chem. 92

Ga.

Improving Present Practices of Freezing Fruits, Vegetables and Meats. To study (1) varieties of fruits, vegetables, and meats suited for freezing in locker plants and home units, (2) use of anti-browning agents and anti-oxidants-citric acid, ascorbic acid, sulphuric acid and others to extend storage life of frozen products, (3) type and methods of packaging to prevent desiccation, oxidation and flavor loss, and (4) better means to sweeten frozen fruits for optimum flavor, color, and texture, by using combinations of sucrose, dextrose and corn syrups.

Hort., Food Process. 3

Ga.

Quality Studies of Vegetables. To (1) study the sensory and nutritional quality components of vegetables; (2) determine chemical and physical means of evaluating sensory quality of vegetables; and (3) evaluate customary procedures of handling vegetables in respect to their effect on sensory and nutritional quality.

Home Ec. 48, coop. USDA

Kans.

Effects of Certain Treatments on Quality of Fruits and Vegetables Preserved by Freezing. To learn (1) effects of preheating on quality of pears preserved by freezing, (2) effects of treating pears, asparagus, and green beans with solutions of Ca salts before freezing, (3) varieties of fruits and vegetables suitable for freezing.

Hort., Home Econ. 233

Kans.

The Comparative Quality and Nutritive Value of Market Fresh and Commercially Frozen and Canned Vegetables. To (1) compare quality, nutritive value, and cost of fresh, frozen and canned vegetables when purchased on local market; (2) determine if there are indications of seasonal differences in quality and nutritive value of these vegetables as purchased; and (3) compare when possible, the quality and nutritive value of market fresh and commercial frozen products with home grown fresh and frozen ones.

Home Econ. 363

- Ky. Some Factors Affecting Firmness of Tissue Structure, Color and Palatability of Frozen Berries and Vegetables and Their Effect on the Ascorbic Acid Content of the Products. To determine the effect of the following factors on the firmness of tissue structure, color and palatability of frozen foods: (1) the addition of CaCl_2 , calcium gluconate, calcium pantothenate in 2 different concentrations to berries and vegetables as they are prepared for freezing; (2) to study the effect of icing berries and vegetables immediately upon harvesting and keeping them iced except for the minimum amount of time required for preparation for freezing; (3) same as (2) above, but adding CaCl_2 to the ice in two different concentrations; (4) to study the ascorbic acid content of the frozen foods prepared for freezing by the different procedures noted above.
Home Econ. 504
- Me. Palatability of Maine Foods. To (1) study quality of fruits and vegetables adapted to soil and climate of Maine, emphasizing seedlings and new varieties developed for Maine; (2) investigate palatability of fresh, stored, and processed Maine vegetables and fruits relative to physical or chemical measurements of quality; and (3) study effects of additives and effect of packaging during storage on flavor of foods.
Agron., Ag.Econ., Pl. Path. 26
- Me. The Effect of Pesticides on Quality of Fruits and Vegetables. To (1) evaluate some sensory techniques commonly used to determine quality of fruits and vegetables; and (2) determine effect of some pesticides on Quality of selected fruits and vegetables.
Hort., Ent., Pl.Path. 28 (NE-15)
- Md. To Develop a Quick and Approximate Method for Determining Presence of Insecticides on Fresh Crops for Processing. To develop a practical bioassay method by which food processors can detect dangerous insecticide residue levels on raw stock.
Ent., Hort. H 46-e, coop. USDA
- Md. Develop Objective and Easily Applied Measures of Quality Factors Involved in Market Grades and Standards. Development of new objective methods for measuring quality factors. Several methods theoretically promising tried on limited number of samples varying widely in quality factor studies.
Hort.Q-58-f (NEM-18), coop. USDA

Mass.

Effect of Pesticides on Quality of Fruits and Vegetables. To (1) develop effective methods for detecting differences in flavor which may be caused by pesticides applied to fruits and vegetables before harvest; (2) determine if flavor differences are due to pesticides per se, to decomposition products of pesticides, or changes in food product itself caused by physiological response of plant to the chemical; (3) correlate pesticide or decomposition product residuals with organoleptic analyses; and (4) determine taste threshold values of pesticides and/or their decomposition products.

Food Tech. 71 (NE-15)

Minn.

Nutritive Value, Quality, and Utilization of Minnesota Fruits and Vegetables. I. A Study of the Changes in Nutritive Value and Quality Which Take Place in Fruits and Vegetables During Home Cooking. II. Testing the Quality of Minnesota Fruits for Culinary Uses. I. To determine (1) the effect of different methods of home cooking (boiling, steaming, pressure sauce pan) on C, Ca and P content of 2 varieties each of cabbage, green beans, sweet corn and squash, and of rutabagas; and on color of cabbage and green beans; and (2) the effect of methods of preparing for cooking (shredding and cutting in different ways) on same nutrients in cabbage, green beans, and carrots from market sources; and on color of cabbage and (3) to work out details for determination (in 1943) of riboflavin, thiamin and iron. II To continue quality tests of Minnesota fruits.

Home Econ. 2004

Minn.

The Nutritive Value and Quality as Determined by Objective Tests of Frozen Fruits and Vegetables. To study (1) the ascorbic acid changes caused in fruits and vegetables by methods of preparation for freezing and of freezing-storage being recommended by the station and (2) color, texture, and any other quality factors possible by objective tests in fruits and vegetables frozen and stored by the methods referred to in (1). (3) To use measurements in (1) and (2) as guides in working out better methods for the freezing and freezing-storage of fruits and vegetables.

Home Econ., Ag. Eng. 2011

Minn.

Dehydration, Freezing, Processing and Storage of Fruits, Vegetables, and Other Food Products. 2. Study of Methods of Preparation and Factors Affecting the Quality of Frozen Fruits, Vegetables, and Other Food Products. 3. Study of the Adaptability of Minnesota Grown Varieties of Fruits and Vegetables for Processing.

Hort. 2103, coop. USDA

Mont.

The Home Freezing of Foods. To investigate (1) freezing quality of varieties of vegetables and berries suited to climatic conditions of Montana, and (2) freezing of cooked and prepared foods using standard recipes with adaptations for altitude.

Home Econ., Hort. MS 832-29

N. J.

A Study of the Influence of Pesticides, Fertilizers, and Other Agents on the Flavor of Fresh, Canned, and Frozen Foods. To provide the Plant Pathology and Entomology Departments and the New Jersey Canners Association with information on the influence of certain pesticides on flavor of fresh and canned foods.

Food. Tech. Ent. 288

N. J.

Influence of Essential Trace Elements on Biochemical Characteristics and Nutritive Values of Plants. (1) Learn extent nutritive quality of plant products, as used in animal feeding, is affected by amounts of essential trace elements supplied to growing plants, (2) Study how supply of each of elements affect biochemical characteristics of plants.

Soils, Pl. Phys. Ag. BioC. 642

N. Y.
(Cornell)

The Retention of Nutrients and Palatability During the Cooking and Freezing of Vegetables and Meats. To determine (1) effect of several cooking methods on vitamins, amino acids and palatability of soybeans before and after freezing, (2) effect of freezing on palatability of kale, and (3) effect of several treatments of beef prior to freezing, on palatability and nutritive value.

A. H., Food & Nutr. 105

N. Y.
(State)

Relation Between the Presence of Oxidizing Enzymes and Keeping Qualities of Frozen Fruits and Vegetables. To determine presence of certain enzymes in fresh and processed plant materials and bearing of these enzymes on blanching requirement and keeping qualities of processed fruits and vegetables.

Food. Sci. & Tech. 2-b

N. Y.
(State)

The Identification of the Nitrogenous Constituents of Fruits and Vegetables in Relation to Maturity and Development of Quality for Processing. To study amino acids, peptides and related nitrogenous compounds occurring in plants, using primarily chromatographic techniques and to learn more about maturation and development of quality.

Food Sci. & Tech. 4-b

N. C.

The Processing of Certain Fruits and Vegetable Crops Now Chiefly Grown for Fresh Market Sale. To increase the financial return to growers for certain fruits and vegetables now grown principally for the fresh market.

Hort. HM-17

N. C.

The Commercial Brining of Fruits and Vegetables. To study (1) improvement of existing salting methods for certain vegetables to reduce losses; (2) extension of salting procedures to many vegetables not now commercially brined; and (3) brining of surplus portions of certain fruit crops as a temporary preservation method.

Hort. 78, coop. USDA

Ohio

Development of Methods for Evaluating Quality of Fresh and Processed Fruits and Vegetables. To (1) develop new methods for quality evaluation of fresh and processed fruits and vegetables, using both subjective and objective techniques; and (2) compare quality evaluations secured by newly developed procedures with those from commonly employed techniques.

Hort. 29

Pa.

The Influence of Various Fertilizers, Cultural Practices, and Agricultural Chemicals on the Quality of Fresh and Processed Fruits and Vegetables. To determine the influence of (1) inherent and environmental conditions and cultural practices on quality of fresh and processed horticultural crops; and (2) various pesticides and other agricultural chemicals on flavor and quality of fresh and processed fruits and vegetables.

Agron. 1239

P. R.

The Effects of Wide Variations in Soil and Weather on the Growth and Nutritive Value of Vegetables. To correlate changes in ascorbic acid and carotene content of certain Puerto Rican food plants with climatic conditions.

Pl. Physiol. 78

S. D.

A Study of the Nutritive Value and Use of South Dakota-Grown Fruits and Vegetables. To (1) study nutritive value, especially vitamin content, of different varieties of fruits and vegetables grown in South Dakota, and (2) develop new ways of using less-well-known fruits and vegetables which grow wild or can be cultivated in home or commercial gardens.

Home Econ. 210

Tenn.

Preservation of Fruits and Vegetables by Freezing. To determine (1) quality under preservation by freezing, of Tennessee fruits and vegetables, (2) most suitable varieties and stages of maturity best suited for freezing, (3) best preparatory treatments of fruits and vegetables, and (4) relative protective qualities of the various wrapping and packaging materials commonly used in frozen-food work.

Chem. 83

Tenn.

Home Preservation of Fruits and Vegetables by Dehydration. To determine (1) varietal suitability of a limited number of Tennessee-grown vegetables, and best stages of maturity for dehydration; (2) relative protective qualities of various containers for dehydrated foods and best home-storage conditions; (3) quality of the dehydrated products; and (4) improvement of the home dehydrator.

Chem 84, coop. TVA

T. H.

The Sodium Content of Selected Fruits and Vegetables Grown in Hawaii. To determine variability of sodium content of some important fruits and vegetables in relation to area where grown and proximity to the ocean.

Food & Nutr., Soils, Chem. 521

Tex.

The Freezing Storage of Texas Fruits and Vegetables. To (1) determine varietal response of fruits and vegetables to freezing; (2) test breeding selections of the breeding programs for adaptability to freezing; (3) evaluate specific varieties when grown under variable conditions as to frozen quality; (4) determine effect of modification of processing procedure on frozen product quality; (5) determine effect of post-harvest handling procedures on quality of frozen product; (6) evaluate various blanching methods for effect on enzyme inactivation and study samples for evidence of enzyme regeneration during storage; (7) evaluate and determine effect of various packing materials and temperatures of storage upon maintenance of quality; (8) develop specialty products; and (9) develop objective measurements of quality on fresh and frozen product.

Hort. 553

- Tex. Development of Methods for Home Canning Vegetables and Fruits. To study (1) development of improved methods for processing home canned vegetables and fruits; and (2) losses in vitamin content caused by canning and storage.
Rur. Home Res. 564, coop. USDA
- Tex. Composition of Vegetable Produced Under Varying Environmental Conditions. To determine the influence of soil and weather on chemical composition of the raw vegetable. To determine the chemical composition of the vegetable after preparation for human consumption.
Hort., Agron., Home Econ., Pl. Path. Chem., 589
- Wash. The Preservation of Fruits and Vegetables by Freezing. To (1) continue research for the improvement and development of frozen products and of processes used in freezing preservation of fruits and vegetables; and (2) study fundamental physical and chemical principles involved in freezing preservation.
Home Econ., Hort. 616
- Wisc. Strengthening Market Demands for Wisconsin Fruits and Vegetables by Developing New Utilization and Processing Methods: Study of Consumers Preference for Levels of Sugar and Salt in Canned Fruits and Vegetables. To gain more needed information of the desired ratio of sugar and salt in canned vegetables, and the intensity of sweetness desired in the pack of certain vegetables, particularly peas.
Dy. & Fd. Ind. 918
- Disease Control
- Ariz. Virus Diseases of Vegetable Crops, Including Melons, in Arizona. (1) Etiological studies on several viruses of melons, potatoes, celery, and lettuce, (2) studies of weed-host ranges, overwintering phenomena, etc., of viruses and their vectors, (3) investigations of now-used crop rotation, and (4) unique ecological factors (climatic and edaphic) found only in this area, and their relation to prevalence of certain viruses of vegetables.
Pl. Path., 286
- Ark. The Use of Fungicides in Controlling Diseases of Horticultural Crops. To determine materials, timing and methods of application best adapted to control of horticultural crop diseases under Arkansas conditions; and evaluate effect of use of fungicides on development of disease complexes of various crops.
Pl. Path. 407

Calif.

Etiology of Storage and Transportation Diseases of Fresh Fruit and Vegetables and Their Depressing Influence on Market Values. To (1) learn cause of different types of disorders of fresh fruit and vegetables in storing and transportation, (2) learn factors favoring occurrence of these disorders, (3) devise ways and means of overcoming the inception and development of these disorders, (4) influence producers, storage operators, and transportation agencies to initiate improved operations by showing depressing effects of these disorders on market values.

Ag. Econ, Hort., Pl. Path. ES 430

Calif.

Physical and Chemical Bases of Plant Disease Resistance To (1) make inoculation tests to determine by subsequent measurement of lesions and by other indications the immunity or resistance or susceptibility of plant species, hybrids, and varieties to fungi, viruses, nematodes, toxins and other toxic chemicals, and to waterlogging and accompanying fermentation products; (2) discover pepper varieties resistant to cucumber mosaic viruses, lima beans resistant to Rhizoctonia solani, lemon tree selections resistant to shell bark and dry bark and viruses that decrease growth rate; and avocado varieties resistant to Phytophthora root rot, verticillium wilt, and Botrytis canker; (3) search for mild strains of viruses to be used for cross protection or vaccination purposes; and (4) search for and identify specific factors involved in disease resistance, as inhibitors of fungus enzymes and dearth of thiamin in citrus varieties.

Pl. Path. 865

Calif.

Aphid-Borne Virus Diseases of Field Crops.

To investigate virus diseases and aphid vectors of such field crops as sugar beets, potatoes, tomatoes, with emphasis upon nature of transmission, factors influencing spread, and possible control measures.

Ent. 1365-A

Del.

Development and Control of Vegetable Diseases Under Irrigation. To determine influence of overhead irrigation on; (1) incidence and severity of various diseases of vegetable crops known to be problems in Delaware, and (2) effectiveness of recommended fungicide spray and dust schedules.

Pl. Path., Hort. 56-P

Fla.

Virus Diseases of Cucurbit and Other Vegetables in Central Florida. To determine mosaic viruses causing diseases of cucurbits, their host range, their insect vectors, and nature of the diseases in efforts to develop practical control measures.

Pl. Path. 538

Idaho

The Biology of Sclerotinia Sclerotiorum (Lib.) Massee. To determine (1) if strains of this organism exist in Idaho; (2) growth, cultural characteristics and varietal susceptibility of Sclerotinia sclerotiorum in Idaho vegetable growing areas; (3) factors in development of sexual stage of organism and if there are different sexual strains of the organism; (4) relative importance of sexual spores in dissemination of organism and spread of disease in Idaho; (5) effect of crop residues on formation and survival of sclerotia in soils.

Pl.Path. A--23

Idaho

Control of Seedborne and Seedling Diseases of Vegetable Crops. To determine (1) most suitable chemicals to treat vegetable seeds; (2) value of local soil fumigation in controlling seedling damping-off and root rots of vegetables; and (3) value of seed treatments at high temperatures in controlling seedborne diseases.

Pl. Path. 236

Kans.

Fruit and Vegetable Disease Investigations. To (1) investigate cause of the diseases and improve vegetable and fruit crops, especially potatoes, sweetpotatoes, cucurbits, tomatoes, raspberries and cherries by obtaining disease resistant selections which are horticulturally desirable and (2) determine how diseases of these crops may be controlled chemically, by breeding and otherwise.

Bot., Pl. Path. 130

Md.

Evaluation of Fungicides for the Control of Diseases of Vegetable Crops. To (1) study effects of fungicidal materials upon metabolic processes in cells of fungi and other organisms to elucidate mechanisms of fungicidal action; (2) continue to test performance of new fungicides and formulations, as they are available, and compare with materials already used as to effectiveness in controlling diseases of vegetables in Maryland; (3) attempt to correlate lab findings with field performance; and (4) devise and evaluate improved methods to apply fungicides to foliage and seed of vegetables and to soils to control pathogens of those crops.

Hort., Ent., Ag. Eng. J-91,
coop. U. S. Public Health Service

Minn.

Ecology, Life History and Control of Insects Attacking Vegetables in Minnesota. To (1) determine most important injurious insects of vegetables in Minnesota from year to year; and (2) develop more effective methods of controlling vegetable and potato insects through observations and experiments of life histories, ecology, varietal resistance, and use of insecticides.

Ent., Zool., Hort., Pl. Path. 1705

Minn.

Epidemiology of Leaf Spots and Other Foliage Diseases of Crop Plants.--IV, Potato, Tomato, and Truck Crop Diseases. To determine the sources of inoculum of leaf diseases organisms and the effect of environmental conditions on leaf diseases of potatoes and other vegetables, principally tomatoes.

Pl. Path., Bot. 2219-4

N. C.

Studies on the Cause and Control of Diseases Affecting Vegetable Crops in North Carolina. To develop more adequate methods of controlling important diseases through: 1. studies to determine prevalence, cause, seasonal development and economic importance of major diseases of vegetable crops; 2. studies on life history perpetuation and distribution of causal agents and influence of environmental factors on them; and 3. studies on control of these diseases by cultural practices, cropping sequences and application of chemical treatments to seeds, plants, and soil.

Pl. Path. 89

Ohio

The Comparison of New Fungicidal, Chemotherapeutic, and Nutritional Formulations for the Control of Vegetable Diseases. To (1) compare newly introduced materials with fungicidal properties with better established or recommended formulations in their ability to control vegetable diseases; and (2) determine limitations and specificities of various new materials other than fungicides for use in vegetable disease control program.

Bot., Pl. Path. 19-1

Ohio

The Development of New Methods for the Application of Fungicidal Formulations to Vegetables, With Particular Reference to The Use of Low-Gallonage Sprays. To develop methods whereby low-gallonage, or concentrate, spray applications may be made to vegetables in such a manner that the resulting degree of disease control will be equal or similar to that obtained with the more dilute formulations now in common use.

Bot., Pl. Path., Ag. Eng. 19-2

Ohio

The Improvement of Vegetable Stands by the Use of Seed Treatments. To determine what chemical compounds or formulations are most effective as seed treatments in combating damping-off and thus improving stand of various vegetables in different types of soil.

Bot., Pl. Path. 19-3

Ohio

Control of Soil-Inhabiting Nematodes, Fungi, Bacteria and Insects Affecting Vegetable Crops. To (1) determine and classify soil-inhabiting organisms responsible for economic loss on vegetable crops growing in Ohio soils. (2) devise means of controlling most destructive organisms, and (3) design and test types of equipment and application techniques for use in applying various liquid and dry formulations in the control of soil-inhabiting pest complex on vegetables.

Bot., Ent., Ag. Eng. 131, coop. USDA

P. R.

Virus Diseases of Plants in Puerto Rico. The work will include (1) a survey to determine in order of importance the virus diseases attacking plants of economic value; (2) laboratory and field studies leading to the elucidation in each particular case of the virus or viruses, including transmission, grafting, insect vectors, identification, and means of dispersal; (3) study of the intermediate and wild hosts; and (4) methods of control, including a study, both in the laboratory and field, of roguing of diseased plants, testing and use of immune or resistant varieties, elimination of intermediate or wild hosts of the viruses, control of insect vectors, vaccination, and therapeutic treatments by the use of heat and chemicals.

Pl. Path. 48

R. I.

Investigation of Decline in Cultivated Plants Due to Associated Plant-Parasitic Nematodes. To (1) determine prevalence and severity of plant parasitic nematode infections of economic crop plants in R. I.; (2) evaluate plant-pathogenic effects of nematode species found associated with declining cultivated plants; and (3) explore use of chemicals as repelling, nematostatic, and nematocidal agents.

Pl.Path., Ent. 605

T. H.

The EDB Dip Process for Fresh Fruits and Vegetables. (1) Analyze equipment needs for applying EDB Dip treatment to fresh fruits and vegetables. (2) Compare equipment needed for batch method and continuous method of treatment in terms of engineering and economic factors involved. (3) Design and construct pilot model processing unit.

Ag. Eng., Pl. Path., Pl. Physiol. 74.2

W. Va.

Testing New Fungicides and Insecticides for Value as Pesticides on Small Fruit and Vegetable Crops. To (1) compare effectiveness of new fungicides and insecticides with that of older pesticides in control of diseases and insects prevalent on small fruit and vegetable crops in West Virginia; and (2) study value of insecticide-fungicide combinations as general purpose pesticides on above crops.

Pl. Path., Bact., Ent. 32

Wis.

Nature of Disease Resistance in Plants. To determine nature of the differences which commonly exist between individuals, strains, varieties, and species of plants in their susceptibility or resistance to disease.

Biochem., Pl. Path. 269

Insect Control

Alaska

Root Maggots in Alaska. To (1) investigate root maggot incidence, wild host plants, dissemination and crop plant damage under various environmental conditions in field and laboratory, and to learn an effective means of control for turnip, seed-corn, onion, and other root maggot species which are, or may become, serious hazards.

Hort., Soils, 45

Ariz.

Insect Pests of Arizona Vegetable Crops. To (1) investigate occurrence, habits and control of insect pests of lettuce, cole crops, sweet corn, peppers, other vegetable crops of commercial importance; and (2) investigate insecticide residues on Arizona vegetable crops of commercial importance; and (2) investigate insecticide residues on Arizona vegetable crops in relation to phytotoxicity, persistence and decomposition under Arizona weather conditions, residues present at harvest and potential hazards to man and animals.

Ent. 257, coop. USDA

Ark.

Ecology and Control of Aphids. To study physical, chemical and biological factors affecting abundance of spinach aphid, turnip aphid, pea aphid, greenbug, and cotton aphid, including effect on populations of sub-lethal applications of insecticides, and effectiveness of various new and standard insecticides in control to be determined in conjunction with the ecological study, with emphasis on control at low temperatures.

Ent. 186.

- Colo. Truck and Garden Crop Insects and Their Control.
To develop the most effective and practical controls
for important truck and garden insects.
Ent., 36
- Del. Controls for Vegetable Insects. Improve control
of vegetable insects by use of resistant varieties, new
toxicants, and better methods of insecticide application.
Ent., 5-E
- Del. Sap Beetles on Horticultural Crops. To determine
importance of, to investigate bionomics of, and to
evaluate control measures for sap beetles on horticultural
crops.
Ent. 428
- Fla. Analytical and Sampling Procedures for Determining
Parathion DDT and Other Organic Insecticide Residues on
Vegetables. To (1) make lab. evaluation, modification and
adaptation of current chemical procedures involved in the
determination of parathion, DDT and other related organic
insecticides on specific vegetable crops; and (2) develop
valid and practical field sampling procedures.
Home Econ. 690 (S-22)
- Fla. Effect of Climatic Factors on Insecticide Residues
on Vegetable Crops. Learn extent to which climatic factors
as sun, rain, and wind affect insecticidal residues on
certain vegetables.
Ent. 746
- Ga. Organic Insecticides for Control of Vegetable Insects.
To determine value of various new insecticides for control
of vegetable insects from the standpoint of effectiveness,
safety, and economy.
Hort., Ent. 29
- Idaho Effect of Lygus Spp. on Clover and Vegetable Seed
Crops. To determine (1) if red, white Dutch, alsike, and
ladino clovers and carrot and parsnip seed crops are
affected by lygus bug feeding; (2) how injury is produced;
(3) lygus bug population trends in these crops and
populations needed to cause economic reductions in seed
yields; and (4) critical period as to plant and insect
development when control measures should be applied.
Ent. 227

- Me. Biology and Control of Vegetable Insect Pests With Special Reference to Soil Inhabiting Species. To obtain better and more practical control of insects injurious to Maine vegetables.
Ent., Chem., Hort. 37
- Md. Studies on the Efficiency of Fixed Boom Low Volume Sprayers. To (1) determine minimum amount of spray needed to secure adequate coverage and satisfactory control of insects on vegetable and canning crops; (2) develop efficient types of spray booms suitable for different row and broadcast crops; and (3) develop versatile equipment that may be used on several crops, particularly the adaptation of corn spraying equipment to spraying of peas and beans.
Ent., Ag. Eng., Bot. H/6-d
- Mich. Insect Vectors of Crop Plant Diseases. To (1) determine insect vectors of aster yellows on potatoes, lettuce, carrots, gladiolus, etc.; (2) study bionomics of species concerned including life history, migration, food plants, ecology, and control; (3) study mechanics of disease transmission by species under study; (4) make inoculation experiments with various virus diseases, using accurately determined species or races of insects; and (5) by mass transfers of infected insects to non-infected plants of the same and of different species.
Ent., Bot., Pl. Path. Hort. 78
- Mo. Investigations and Control of the Codling Moth and Other Fruit and Vegetable Insects. To (1) develop more efficient spray program for control of insects and mites attacking tree fruits, (2) develop effective program to control insects and mites attacking small fruits, (3) study biology of arthropod pests of vegetable crops, and develop better methods for their control, and (4) study residues of chemicals applied to fruits and vegetables under field and laboratory conditions.
Ent. 31
- N. J. The Efficiency and Host Tolerance of New Insecticides, Spreaders, and Stickers in the Control of Insects Attacking Vegetable Crops. The insecticides, spreaders, stickers, and activators proposed for testing are DDT, TDE, benzene hexachloride, Chlordane, chlorinated camphene, methoxy analog of DDT, Parathion, piperonyl cyclonene and piperonyl butoxide in combination with rotenone, pyrethrum, and Ryania.
Ent. 179

N. C.

Biology and Control of Insects and Mites Affecting Vegetable Crops. To (1) develop better methods of controlling vegetable pests; (2) study effects of insecticides on injurious and beneficial insects and on crop yield and quality; (3) study life histories and ecology of vegetable pests; (4) determine importance of various species of insects and mites affecting vegetables in the State and ascertain their geographical and seasonal distribution; and (5) find out the insect vectors of plant diseases.

Ent. 45, coop. USDA

Ohio

Insects and Allied Pests that Attack Glass House Vegetable Crops. To (1) obtain more information of biology and ecology of insect pests on vegetables grown in glasshouses; (2) investigate conditions responsible for development of resistant strains of mites and insects; (3) study control of measures being used and attempt to improve them; and (4) investigate and devise controls for newly introduced or unusual pests if and then they appear.

Ent., Hort. 25

Oreg.

Toxicological Studies on the Gray Garden Slug.

To (1) determine effect of time, temperature, and moisture on residual life of metaldehyde, (2) improve formulation and application of metaldehyde, (3) investigate effects of metaldehyde and other chemicals on metabolism of the slug, (4) screen chemicals as slug toxicants, and (5) make ecological studies on the slug.

Ent., Ag. Ehem., 90-1

Oreg.

The Symphyliid Scutigerella Immaculata Newport, Its Biology and Control on Truck, Nursery, and Greenhouse Crops. To study effects of (1) different methods of soil tillage on soil pests, (2) soil fumigants on pests, and (3) combinations of tillage and soil fumigants on symphyliid and other pests.

Ent. 109-1

T. H.

The Biology and Ecology of Dacus Dorsalis, D. Cucurbitae, and Ceratitis Capitata in the Hawaiian Islands and of Other Trypetidae Should They Become Established There. To determine the range and abundance of the species, a program of trapping adult flies throughout the Territory will be carried out, as well as a program of rearing flies from fruit, both bait and naturally occurring fruit. To determine seasonal variation in abundance the above program will be continued and field observations made to obtain data on activities throughout the year. To determine the hosts of each species, field and lab observations on host fruit and host preference of each species will be made. And to study the relationship of the flies to each other and to other species, field observations and lab examination will be made, giving special attention to parasites and predators.

Ent. 960-3

Wis.

The Relation of Leafhoppers and Aphids to the Transmission of Vegetable Crop Viruses. Learn species responsible for dissemination of truck crop viruses and their importance in epidemiology of diseases under field conditions, habits, host relations, migration, and reducing insect vectors by insecticidal, biological, and cultural means will be studied. Lab, and greenhouse studies will show basic factors involved in vector-virus-plant relationships: as acquisition sequence; inoculation, retention, and latent periods, and vector feeding habits.

Ent., Hort., Pl. Path. 725

Economics and Marketing

Ala.

Marketing Facilities and Handling of Truck Crops in Alabama. Analyze (1-2-3) trends in production and marketing of truck crops produced within State and make comparisons in relation to competing areas; farm marketing and handling practices in important areas of commercial production in State from standpoint of adequacy; certain markets and facilities from standpoint of adequacy; (4) evaluate cooperative marketing in movement of State truck crops as means of increasing net income to farmers.

Ag. Econ., Hort. 566 (SM-8)

Calif.

The Behavior of Prices and Margins at the Various States of Marketing Fresh Fruits and Vegetables. To (1) develop efficient operating and research procedure to collect appropriate data and analyze it to determine, measure and explain the temporal behavior of prices and marketing margins at several stages of distribution and of factors associated with such behavior; (2) determine and analyze statistically the interrelationships between changes in wholesale prices and changes in retail prices, with consideration to lead and lag tendencies as well as sluggishness and responsiveness of retail price changes to wholesale price changes; (3) determine and analyze statistically the behavior of and relations between marketing margins and their relation to sales prices at the successive points in distribution supply pipe line between producer and consumer; (4) determine and analyze statistically, the net functional relations between changes in retail prices and changes in quantities sold at retail; and (5) determine and analyze statistically temporal daily distribution within retail selling period of a week of the daily volume sold as a per cent of the week's total, so as to yield information useful in timing and temporal distribution of sales by distributors and purchases by retailers.

Ag. Econ. 1363

Calif.

Economic Analysis of Marketing Control Programs for California Fruits and Vegetables Under State and Federal Legislation. To (1) analyze development of statutes through which compulsory market control programs have been sanctioned, (2) analyze development of operations of major commodity programs and voluntary programs antecedent to them, (3) determine kinds of market problems which apparently can be solved or mitigated through market control programs, (4) determine apparent requirements for effective administration of State, federal and voluntary programs, (5) determine objectives of market control program and appraise degree to which objectives have been met, and (6) determine effects of control programs upon productive capacity, demand levels, magnitude of total receipts, volume of consumption, etc.

Ag. Econ. 1379

Calif.

Costs and Efficiency in the Marketing of Selected California Fruits and Vegetables. To (1) determine basic physical and economic relationships involved in the operation of deciduous fruit packing houses; (2) indicate how changes in work methods and type of equipment and in-plant organization will affect efficiency and costs; and (3) on the basis of above, develop practical means for improving efficiency in operation of California deciduous fruit packing houses.

Ag. Econ. 1574, coop. USDA

- Fla. Marketing Charges and Returns From Florida Vegetables by Types of Firms and Methods of Sale. To investigate conditions which determine methods of sale used by Florida firms in marketing green beans, green peppers and tomatoes and effect of method of sale upon marketing charges and returns to growers.
Ag. Econ. 666, coop. USDA
- Ga. Marketing Vegetables. To (1) make further study of data already assembled and prepare a manuscript for a Station bulletin which will be an elaboration of more significant aspects of the economics of marketing fresh vegetables of the State; and (2) make further tabulations and analysis of data already assembled on okra sales in a specialized market at Cairo, Georgia and to prepare a manuscript for a Station bulletin.
Ag. Econ. 1
- Ga. Potential Markets for Vegetables Grown in North Georgia Counties. Learn (1) potential markets for vegetables grown in selected North Georgia counties, (2) type of competition growers would meet in designated potential markets.
Ag. Econ. 92
- Ga. Marketing Fruits and Vegetables Through Commercial Processors. To improve quality, uniformity, and marketability of Georgia processed fruits and vegetables to obtain larger share of markets for these products.
Ag. Econ, Food. Proc. 163, coop. USDA
- Ill. An Economic Analysis of Grower-Canner Relationships in the Marketing of Vegetables for Canning in Illinois. To (1) describe vegetable canning industry, (2) analyze economic relationships influencing buying practices.
Ag. Econ. 05-346
- Ill. Economics of Grading Vegetables Grown in Chicago Area in Conformity With Quality Standards. To determine what grade standards should be used by vegetable growers in the Chicago Area to maximize returns.
Ag. Econ., Hort. 05-349

Kans.

The Marketing of Kansas Potatoes, Melons, Onions, Fruits and Minor Crops. To determine costs and methods of preparing and marketing Kansas potatoes in relation to consumer's demand and producer's net incomes. To determine production and marketing techniques that will increase the demand for Kansas melons. To determine new methods of harvesting, storage, merchandising, and market outlets for Kansas onions. To determine existing methods of harvesting, processing, storage, and marketing of Kansas fruits, and to consider possible reorganization of the marketing procedures used by small producers to stabilize producers' incomes and to reduce marketing costs.

Ag. Econ., Hort. 257, (NCM-13), coop. USDA

Ia.

Consumer Demand for Canned Sweet Potatoes and Okra. To learn nature of present and potential demand for canned sweet potatoes and okra so that growers, canners and wholesale and retail distributors may improve production and marketing of same.

Ag. Econ. 318

Ia.

Marketing Fruits and Vegetables. To (1) study marketing methods and practices of producers and marketing agencies to find means of effecting improvements which will increase efficiency and reduce costs of operations, maintain or improve product quality, and stimulate demand; (2) analyze nature and organization of marketing agencies as to adequacy of servicing, facilities, charges, etc.; (3) determine most profitable market outlets for Louisiana fruits and vegetables during different seasons of the year; (4) study sweet potato storage practices and costs to find conditions under which storage at various stages in marketing is economical; and (5) obtain data on fruit and vegetable processing, as a basis for pricing, to determine most profitable outlets, appraise production potential of the industry, and determine labor and material needs of processors.

Ag. Econ. 725

Ia.

Merchandising Louisiana Fruits and Vegetables. To (1) ascertain effect of different sizes and shapes, qualities, and varieties of product on consumer demand in retail stores; (2) determine preferences and expectations of consumers for certain stages of preparation of the product for final use; (3) survey present methods of displaying fresh fruits and vegetables at retail; (4) evaluate relative effectiveness of different display techniques in attracting interest of consumers; (5) determine preferences of consumers for bulk vs. packaged product with or without a price differential; and (6) determine type and size(s) of packages best suited to specific products.

Ag. Econ. 836

- Me. Improved Marketing Practices for Maine Processed Crops. Learn volume of retail sales for various qualities, grades, styles, brands, sizes of containers and other allied factors accompanied by prices of certain processed products by present merchandising methods in selected New England markets. Suggest and test various methods and techniques to increase sales and consumer satisfaction and maximize returns to producers.
Ag. Econ. 56, (NEM-16)
- Me. Cost and Returns in the Production of Sweet Corn, Peas and Snap Beans for Processing. Learn inputs and outputs, and costs and returns in producing sweet corn, peas, and snap beans. Describe farm organization patterns and management practices. Suggest adjustment to lower costs and increase returns.
Ag. Econ., Agron. 60
- Md. Economies of Scale, and Factors Affecting Variations in Costs of Processing Fruits and Vegetables in Maryland. To learn (1) unit cost of processing food products in single and multiple product plants, (2) extent of variation in unit cost by products and at varying levels of operation as percentages of plant capacity, (3) variation in unit product cost among plants of different sizes at similar levels of capacity operation.
Ag. Econ., Hort. A-34 (NEM-16), coop. USDA
- Md. Quality and Volume Effects Upon Economics of Plant Operation in the Canning of Tomatoes, Corn and Peas in Maryland. To determine influence of variations in quality, volume and warehouse handling on plant efficiency and merchandising.
Ag. Econ., ES301
- Mass. Analysis of Fruit and Vegetable Marketing in a Consuming Area. To investigate changes in (1) distribution as result of development of super markets and to indicate trends and opportunities of new and developing systems, and if possible, indicate ways to bring price reporting up to date with present processing, distributing and retailing operations,
Ag. Econ., Fm. Mgt. ES 180

- Mich. Measuring and Analyzing the Consumer Market for Fruits and Vegetables. To (1) determine patterns of consumer purchases of individual fruits and vegetables of importance to Michigan; (2) determine factors associated with different patterns of consumer behavior; and (3) measure market potential for Michigan fruits and vegetables.
Ag. Econ. 112
- Mich. Increasing Efficiency in Operation of Firms Handling Agricultural Products. To conduct studies designed to measure and compare costs and efficiency of alternative technologies, practices, procedures and size of firms or plants handling agricultural products.
Ag. Econ., ES 289
- Miss. Opportunities for Increased Efficiency in Marketing Channels and Services for Locally Produced Farm Products to Meet Changes Associated with Industrialization. To investigate opportunities for increased efficiency in marketing specific locally-produced farm products through channels of trade in expanding industrial centers.
Ag. Econ., Home Econ., HA-16
- Mo. Marketing Fruits and Vegetables. To determine influence of retail practices and facilities on quality, condition and salability of selected fresh fruits and vegetables in retail stores; measure and compare acceptability to consumers; and develop methods by which consumers' preferences and requirements may broaden outlets for such products and increase returns to producers.
Hort. 63, coop. USDA
- Mo. Marketing Missouri Vegetables. To determine (1) characteristics of the vegetable industry in Missouri in these areas: products produced and location of this production, volume of commodity by areas, when product is produced and marketed and what other States produce and market this commodity at same time, market outlets available and method and conditions under which product is sold, prices received from market outlets as to various other uses, and (2) methods of marketing and institutional factors that have a bearing on marketing of fruits and vegetables in the State.
Ag. Ec., 262

N. J.

Adapting our Marketing of Fruits and Vegetables to Present and Future Production and Consumption Conditions. To investigate the possibilities of more efficient marketing of fruits and vegetables to the mutual benefit of producers, distributors, and consumers, the ultimate aim to be elimination of waste, reduction in marketing costs, better quality for consumers and an increased consumption. To increase and maintain quality from farm to consumer together with wider and more direct distribution. Involved are: careful grading, proper packaging, efficient selling and transportation, effective conditions of storage, adequate transportation, modernized retail handling.

Ag. Econ. 29

N.J.

To Determine, Compare and Evaluate Procurement Practices Among Processors, and Adjust Production to Meet Processing Needs. (1) Learn procurement practices among State processors in procuring State production and out-of-State production; (2) Readjust State production to meet processing needs.

Ag. Econ., Hort. 40 (NEM-16)

N. Y.

(Cornell)

An Evaluation of the Status of Prepackaging Vegetables in the Northwest. Learn if and what degree vegetables grown in Northeast are being prepackaged in consumer units, and adjustments in procedures needed to be made to meet changing conditions in vegetable industry.

Ag. Econ., Hort. 13-3, (NEM-18), coop. USDA

N. Y.

(Cornell)

Fruit Marketing---7. Influence of Merchandising Practices on Volume of Fruit and Vegetable Sales. To determine influence of merchandising practices in volume of fruit and vegetables in retail stores.

Ag. Econ. 14-7

N. Y.

(Cornell)

Costs and Returns in Producing Tomatoes, Snap Beans, Sweet Corn and Broccoli Grown for Processing in New York. To (1) determine amounts of different physical inputs used, their costs, and production resulting when growing tomatoes, snap beans, sweet corn and broccoli for processing in commercial producing areas of N. Y.; (2) consider variability in yield response and net enterprise earnings under common soil and climatic conditions associated with different cultural practices; and (3) evaluate possible effect of mechanical pickers on snap bean and sweet corn industries.

Ag. Econ. 11

N. C.

An Evaluation of the Market Structure in Selected Vegetable Producing Areas of the South. To determine how well the existing market structure serves selected vegetable producing areas with respect to physical facilities, availability of associated services such as grading, packing, and transportation, the number, sizes, and types of buyers, and the process of price formation.
Ag. Econ. M 15, (SM-8)

Ohio

The Marketing of Greenhouse Vegetables in Ohio. To determine (1) competitive position of greenhouse tomatoes and other vegetables to that of shipped product now and before the war; (2) methods of merchandising and quality control to help the industry to better its competitive position; and (3) methods and standards by which growers and shippers can market their product in a manner more acceptable to consumers.
Ag. Econ., Rur. Soc. 95

Ohio

Trends in Production Prices and in the Methods of Marketing Ohio Fruits and Vegetables. To (1) determine trends in production and use of fruits and vegetables; (2) determine trends in prices of major fruits and vegetables and reasons for trends; (3) determine trends in production and prices of fruits and vegetables in competing States and areas relative to Ohio; and (4) evaluate trends in terms of their effect on marketing efficiency in these crops in Ohio relative to competing States under present and probable future conditions.
Ag. Econ. Rur. Soc. 98

Okla.

Vegetable and Small Fruit Marketing in Oklahoma. Learn means of improving present marketing methods and services and of reducing costs in marketing spinach, snap beans, sweet corn, watermelon, tomatoes, sweet potatoes, and small fruits.
Ag. Econ. 852, ES 278

P. R.

Marketing Methods and Facilities in Puerto Rico for Fruits and Vegetables Destined to the New York City Market. To determine (1) actual and potential production of fruits and vegetables for exportation of New York City; (2) methods used to move such product from primary producers to docks; and (3) adequacy of existing marketing methods and facilities.
Ag. Econ. 74

- P. R. Expanding The Market for Selected Vegetables in Puerto Rico. (1) Learn possibility of expanding market for selected vegetables through adequate outlets, facilities and services, and to indicate needed improvements.
Ag. Econ., Rur. Soc. 97 (SM-8)
- Oreg. Labor and Equipment Efficiency in Freezing Oregon's Principal Fruit and Vegetable Crops. (1) Describe frozen food industry of State with emphasis on green peas and beans, sweet corn, and strawberries. (2) Learn physical input-output relationships in raw material assembling and freezing operations. (3) Learn comparative efficiency of different methods, organizations, and scale of operations used in assembling and freezing. (3) Estimate costs for assembling and freezing operations.
Ag. Econ., Food Tech. 280, (WM-17), coop. USDA
- S. C. Retailing and Family Buying Practices as Related to the Marketing of Fruits and Vegetables. To determine (1) influence, in purchase of selected fruits and vegetables, of a. family buying practices, b. family characteristics such as occupation, income, etc., and c. offerings and services of retail outlets; and (2) kinds and sources of information used by food buyers and how these relate to purchase and use of selected fruits and vegetables.
Home Econ., Ag. Econ., 54 (SM-13)
- Tenn. Buying Policies and Other Practices of Vegetable Marketing Organizations in Tennessee. To determine effects of (1) buying policies and practices of firms on quality of strawberries, tomatoes, and cabbage purchased for both intra and inter-state markets; and (2) buying policies of firms on price the producer received.
Ag. Econ., and Rur. Soc. 9 (SM-8), coop. USDA
- Tenn. Retailing and Family Buying Practices as Related to Purchase of Fruits and Vegetables by Rural Mountain Families. To Learn (1) in purchase of fruit and vegetable sources of ascorbic acid, the influence of family buying practices, family characteristics, occupation, income, etc., and store offering and retail marketing services, and (2) kinds and sources of information used by family food buyers and how it relates to purchase and use of fruit and vegetable sources of ascorbic acid.
Home Econ. 109 (SM-13)

T. H.

Economic Factors Involved in the Sale of Frozen Fruits and Vegetables in the Honolulu Market. To describe and evaluate the marketing process through which frozen fruits and vegetables are distributed after they reach Hawaii from points of production on the Mainland.

Ag. Econ. 360 (WM-17), coop. USDA

Tex.

Distribution and Importance of the Vegetables Marketed from Texas. To determine (1) distribution and volume of various vegetables within the market areas for mixed and straight rail and truck loads; and (2) number of various types of containers used to ship vegetables.

Ag. Econ & Soc. Hort. 960

Tex.

Analysis of the Fruit and Vegetable Marketing Problems of East Texas with Respect to Harvesting and Packing Practices, Market Organization and the Competitive Position of the Area. (1) Evaluate present fruit and vegetable harvesting and packing practices in area with respect to their effect on demand for products in relation to current standards and requirements of trade. (2) Make economic analysis of general efficiency of present market organization and its facilities, from viewpoint of sellers and buyers. (3) Learn general competitive position of East Texas in commercial production of specific fruit and vegetables indigenous to area.

Ag. Econ. & Soc., Hort. 1053

Tex.

West Texas Vegetable Market Potentials and Facility Requirements. (1) Evaluate specific vegetable crops in terms of competitive position at season of production. (2) Analyze potential buying strength for specific qualities and quantities of each crop at specific markets at season of production. (3) Learn facility requirements in terms of volume, location, crops handled, packing, labor, and transportation.

Ag. Econ. & Soc. 1077, coop. USDA

Wash.

Economic Efficiency in Freezing Washington's Principal Fruit and Vegetable Crops. (1) Describe frozen food industry of State with emphasis on major crops frozen. (2) Learn physical input-output relationships in raw material assembling and processing. (3) Learn comparative economic efficiency of different methods, organizations, and scale of operations used in assembling and freezing.

Ag. Econ., Home Econ., Hort. 1300 (WM-17), coop. USDA

ASPARAGUS

Breeding

- Ill. Rust Resistance in Asparagus. To develop methods of control of asparagus rust by fungicides and breeding, including (1) reinvestigation of life history of the pathogen, host-pathogen relations, artificial inoculation methods and use of eradicator and summer sprays, and (2) selection of existing rust resistant strains and their propagation, methods of securing lines homozygous for rust resistance, and crossing these lines to secure superior hybrids.

Field Crops, 65-348

- Minn. Breeding an Improved Strain of Asparagus. To breed an improved strain that could be furnished to seed growers for distribution to the public and to test available strains at three different localities in the State.

Hort. 2117

Culture

- Del. Cultural Problems of Asparagus Production in Delaware
(1) Learn best use of fertilizer including minor elements.
(2) Ascertain if previously found good fertilizer and cultural practices will improve yields when combined in a single treatment. (3) Accumulate data toward establishment of optimum nutrient levels in asparagus through spectrographic tissue analysis.

Hort. 10-H

- Del. Bud Formation and Development in Asparagus. To study growth and development of Asparagus officinalis with emphasis on time and rate of bud formation and factors which influence this process.

Hort. 53-H

- Del. Persistence and Penetration of CMU in Asparagus Soils. To determine degree of persistence and penetration CMU (3-parachlorophenyl-1,1-dimethylurea) in asparagus soils particularly as affected by irrigation and soil organic matter.

Hort. 55-H (NE-12)

N. J.

Cultural and Handling Investigations With Asparagus

To obtain data (basic & applied) on various factors affecting asparagus production; and factors affecting quality of fresh and processed asparagus.

Hort., Veg. Crops, 348

Pa.

Effectiveness of Herbicides for Weed Control in

Asparagus Plantings. To determine feasibility of using herbicides in weed control in asparagus.

Hort. 1095-E

BEANS AND RELATED CROPS

Breeding

Colo. Testing Foreign Bean Introductions for Resistance to Root Rots and Other Diseases. To (1) determine resistance of foreign introductions and other sources of germplasm to root rotting organisms of beans; (2) determine compatibility of most promising selections in crosses with best varieties of beans now grown; (3) initiate breeding program whereby new or improved varieties resistant to organisms causing root rots will be developed; and (4) determine, incidentally, resistance of foreign introductions to other diseases common to the region.

Agron., Bot., Pl. Path., 85 (W-12)

Fla. Vegetable Breeding Emphasizing Table Legumes. To (1) produce new varieties of table legumes adapted to requirements of various commercial producing areas of Fla.; and (2) make limited exploration of breeding possibilities of non-leguminous vegetable types.

Hort. 501

Ga. Improvement of Type and Disease and Insect Resistance in Southern Peas (*Vigna Sinensis*) Through Breeding. To develop productive varieties of Southern peas with improved qualities for processing and fresh market and to incorporate into these a resistance to *Fusarium* wilt, powdery mildew, bacterial blight, and nematodes. A total of 355 lots of seed of the genus *Vigna* has been collected, including 280 foreign introductions and 75 varieties of *Vigna sinensis*. These will be observed and classified as to nature seed characteristics. Greenhouse and field studies will be conducted to determine adaptability, productivity and insect disease resistance. Using selected plants that are desirable as parental material, it is planned by hybridization and selection, to develop varieties with the characteristics stated above. Selected lines that are considered worthy of extensive testing will be included in trials at the S. E. Ga. Branch Exper. Station, Midville, Ga., in cooperation with the Horticulturists of the Branch Stations.

Hort. 84

Idaho

Bean Disease Investigations in Idaho

To develop varieties resistant to diseases of major importance to bean production in Idaho.

Pl. Path. 228

Idaho

Development of Field and Garden (Dry and Snap)

Beans Resistant to Certain Virus Diseases, and a Study of the Viruses Causing These Diseases. To (1) develop, through breeding, new varieties of field and snap beans of acceptable quality, having resistance to common mosaic, curly top, and other important bean virus diseases; and (2) conduct fundamental research on viruses causing diseases of beans, as related to their properties, relation to each other, and to expression under different environmental conditions.

Pl. Path., Hort. 282, (W-12), coop. USDA

Me.

Breeding of Blight and Anthracnose Resistant

Varieties of Beans. To obtain through selection and/or hybridization suitable market type snap and field beans that are resistant to halo blight and to local strains of anthracnose.

Pl. Path., Hort. 17

Miss.

Snap Bean Breeding and Quality Studies. To (1)

develop by breeding methods varieties of snap bean with high yielding ability, dark green color, low fiber content, slow seed development rate, 5-6in. pod, and pods that retain form and do not discolor liquid in the can; (2) determine how often snap beans must be picked to process and pack a high quality product; and (3) study sensory qualities relating to pod color or chlorophyll content of snap bean varieties in Southern Cooperative Snap Bean Variety Trials.

Hort. HK-14, coop. USDA

Nebr.

Bean Breeding. To develop new varieties of field

beans (Phaseolus vulgaris) having resistance to disease, improved horticultural characters, and adapted to Nebraska conditions.

Hort. 436, coop. USDA

N. Mex.

Improvement of Field Beans. To develop improved

strains and varieties of field beans with these characteristics: 1. high yields; 2. early maturity; 3. uniformity of flowering and maturity; 4. upright growth habit; 5. stiff stalk; 6. shatter resistance; 7. drought resistance; 8. resistance to common bacterial blight, rust, ashy stem, root knot, curly top, and mosaic; and 9. superior market qualities--easy cooking, large, plump, uniform-size beans, etc.

Agron. 11

N. Y.
(Cornell) Bean Breeding. To develop varieties and strain of dry and snap beans, superior to the present in yielding ability, disease resistance, earliness, quality, and adaptability to mechanical harvesting.
Veg. Crops., Pl. Path., Pl. Brgd. 120

N.Y.
(State) Development of Improved Strains of Canning Crop Vegetables. 1. Breeding of Heat-Tolerant, Root-Rot Resistant Peas for Canning and Freezing. To breed variety of peas of good quality, resistant to root rot and tolerant of heat.
Veg. Crops. 16-a

N. Y.
(State) Breeding New Varieties of Lima Beans for Processing in New York. To (1) produce a lima bean of Fordhook type with these characteristics; green cotyledon, green seed coat, earliness, concentrated set, and high yield--also nematode tolerance and downy mildew resistance, if possible (2) add to genetic knowledge of lima beans by working out the inheritance of characters involved in breeding project when possible.
Veg. Crops. 16-c , coop. USDA

N. Y.
(State) The Production of New Varieties of Snap Beans by Breeding. To (1) develop new varieties of green and wax beans to more nearly fit needs of N. Y. growers and processors, including high yield, disease resistance, earliness, and general high quality, and especially having white seeds, more slender pods, and an upright bush which bears pods high and matures crop all at one time to facilitate mechanical picking; and (2) add to the knowledge of genetics of beans by studying genetic characters where they affect the breeding program.
Veg. Crops. 16-d

Oreg.
 Inheritance of Resistance to Bean Yellow Mosaic in Phaseolus Vulgaris. To determine, through genetic analysis, the inheritance of resistance in Phaseolus vulgaris to the virus causing bean yellow mosaic.
Hort., Pl. Path. 49-1 (W-12)

Pa.
 Chemical Weed Control in Lima Beans. To investigate weed control methods and techniques applicable to culture of lima beans, with special emphasis on the use of chemical herbicides.
Hort. 1095-J

- P. R. The Production of a Stringless Bean Variety Adapted to Puerto Rico. To develop a stringless strain of bean adapted to the short, warm days of the tropics by hybridization of the stringless types commercially grown in the U. S. with our selected native white varieties.
Pl. Brdg. 37
- S. C. Breeding Edible Southern Peas. To develop high quality, high yielding, disease and insect resistant varieties, adapted to mechanical harvesting and shelling, and suitable as dry, processing, or fresh market peas.
Hort., 61
- Tenn. Inheritance in Garden Beans With Reference to Resistance to Mexican Bean Beetle and Other Insects, Nematodes, Diseases, Southern Adaptation and Commercial Quality. To study possibilities of combining species, kinds and varieties of beans in order to develop Southern garden beans.
Hort. 121, coop. Reg. Veg. Brdg. Lab.

Varieties

- Miss. Selection and Testing of Lima Beans. To (1) find high quality varieties of lima beans better adapted to Mississippi conditions, suitable for processing purposes on a commercial basis as well as in the home, and to find better varieties for fresh market, and (2) learn methods of predicting maturity dates with selected varieties of lima beans.
Hort. HK-11
- Miss. Qualitative Studies of the Yield and Nutritive Value of Southern Peas. To (1) determine highest yielding varieties of southern peas; (2) determine relative starch, sugar, and vitamin C content of better adapted varieties; and (3) study factors which affect processing quality of southern peas.
Hort. HK-16

Culture

- Del. Flower- and Pod-Drop in Lima Beans. To find a method to reduce flower- and pod-drop in lima beans caused by unfavorable weather conditions.
Hort. 37-H
- Idaho Irrigation of Bean Seed Crops. To (1) determine optimum frequency for irrigation of bean seed crops, (2) determine relationships between irrigation treatments, varieties, and plant spacing, (3) determine effect of experiment variables of items 1 and 2 on a bean diseases including Sclerotinia, Pythium, and Fusarium root rot, and b maturity date, and (4) test several types of soil moisture measuring devices for accuracy in determining soil moisture content.
Ag. Eng. 251, coop, USDA
- Miss. Studies of the Effects of Nitrogen, Plant Spacing, High Humidity, and Day Lengths Upon Pod Set and Yields of Southern Peas. To learn (a) best N level and Plant spacing combination for high yield of southern peas, (b) effect of high humidity upon pod set of peas, (c) day length best suited to pod set.
Hort., Soils. HK-17
- Pa. Chemical Weed Control in Lima Beans. To investigate weed control methods and techniques applicable to culture of lima beans, with special emphasis on the use of chemical herbicides.
Hort. 1095-J
- Wash. Metabolism of Germinating Peas. To study nature of reactions which take place during germination of pea seeds, mechanisms by which reactions are controlled, and resulting changes in constituents of plant.
Ag.Chem. 769
- Wisc. Applications of Plant Growth Substances and Their Mechanism of Action. To amplify present applications, develop new uses for plant growth substances, determine manner in which they exert their effects, and investigate their use in controlling starch production of peas and their influence on protein content of field crops.
Agron., Biochem. 755

Harvesting and Storage

N. Y.
(Cornell)

Drying of Grain, Legume and Grass Seeds, Beans, Forage Crops, and Other Farm Products. To (1) determine fundamental biological factors involved in drying of farm crops and seed; (2) determine type or types of equipment, including use of supplementary heaters and drying agents, best suited for economical drying of farm crops and seed in New York; and (3) design, build, and test drying equipment that will make possible the retention of a greater percentage of the original and desirable characteristics of farm crops.

Ag. Eng., A.H., Pl. Bldg. 33

Processing and Utilization

Del.

Lima Bean Silage. To determine feeding value of lima bean silage for dairy cattle.

Anin. & Poul Ind. 33

N. Y.
(State)

The Yield and Quality of Canned Peas From Raw Material of Varying Maturity. To relate the yield and quality of the canned product to the maturity of the raw peas when harvested. Results of different methods of determining quality of canned product will be correlated with an index of maturity such as tenderometer readings, made on raw peas. Amount of canned material obtained from a given quantity raw product will be correlated also with tenderometer readings.

Veg. Crops, Food. Sci. & Tech. 4-a

P. R.

The Canning of the Pigeon Pea. To determine (1) maturity indexes for harvesting at proper maturity; (2) most adequate procedures for size and maturity classification; (3) conditions necessary for adequate blanching; (4) most adequate canning procedure to control number of splits and prevent discoloration; (5) most adequate type of container for the product; (6) most adequate processing schedule; (7) behavior during storage; (8) factory control procedures and quality standards; and (9) canning quality of different pigeon pea varieties of P. R.

Chem. 70

Tenn.

Quality of Frozen Snap Beans as Affected by Methods of Transportation, Processing, Duration and Temperature of Storage. Ascertain most suitable varieties and proper stages of maturity of green snap beans grown for the fresh market and for commercial processing. Find best preparatory treatment for blanching. Study quality of beans as affected by duration and temperature of storage. Conduct consumer acceptance studies of several varieties of beans prepared and stored under different conditions.

Chem. 86

Disease Control

Del.

Lima Bean Downy Mildew Disease, Etiology, Epiphytology and Control. To (1) determine life history of causal organism (Phytophthora phaseoli Thaxt.), how it overwinters, source of primary inoculum in spring, and mode of dissemination; (2) determine effect of environment on growth and development of causal organism, host-pathogen relations, and outbreaks of epiphytotics; and (3) evaluate old, and develop new, control practices, cultural, resistant breeding lines and selection, and use of fungicidal sprays and dusts.

Pl. Path. 20-P, coop. USDA

Idaho.

The Biology of Sclerotinia Sclerotiorum (Lib.) Massee. To determine (1) if strains of this organism exist in Idaho; (2) growth, cultural characteristics and varietal susceptibility of Sclerotinia sclerotiorum in Idaho vegetable growing areas; (3) factors in development of sexual stage of organism and if there are different sexual strains of the organism; (4) relative importance of sexual spores in dissemination of organism and spread of disease in Idaho; (5) effect of crop residues on formation and survival of sclerotia in soils.

Pl. Path. 205

Miss.

Investigation of Pea Diseases and Their Control. To (1) determine occurrence of major pea diseases in Mississippi and relative importance, (2) investigate life cycles of major pathogens in relation to culture of the crop and climate and determine if there are effective control methods; (3) develop greenhouse and field techniques for determination of resistance and susceptibility; and (4) investigate seed stocks now available for resistant varieties which may be incorporated into types found in this region.

Pl. Path. & Phys. HL-10

Miss.

Investigation of the Diseases of Cowpeas and Their Control. To (1) determine what diseases other than Fusarium wilt, occur on cowpeas in Miss. and relative importance, (2) investigate life cycle of pathogens and disease cycle of pathogens and disease cycle of any damaging disease found under (1), (3) design and conduct experiments on control measures wherever control is deemed necessary and appears feasible, and (4) investigate Fusarium wilt disease thoroughly and develop suitable control.

Pl. Phys. & Path. HL-11

Wash.

Insect Transmission of Bean Virus Diseases. To learn (1) what insects are responsible for field transmission of bean virus diseases; (2) seasonal cycles, field distribution and alternate hosts of those insects transmitting the diseases; (3) effect of insect control on field spread of virus diseases of beans; and (4) native and cultivated plants which serve as reservoirs of bean virus diseases.

Hort., Pl. Path., Ent. 1221 (W-12), coop. USDA

Wyo.

Bean Diseases in Wyoming. To (1) determine prevalence and extent of damage of various known bean diseases, (2) determine host range, (3) study methods of spread, (4) evaluate cultural and chemical control practices, (5) test lines and varieties of beans to the various diseases, (6) study cultural characters and nature of pathogens in laboratory and greenhouse, (7) determine physiologic races of bean rust and possibly of other bean diseases, and (8) collect and study new diseases which may appear.

Pl. Path., Agron. 497

Wyo.

Control of Root Rot of Beans by Crop Rotation and Irrigation Methods. To determine (1) effect of various crops in rotation on population and incidence of root rot organisms in the soil; (2) length of rotation needed to reduce root rot of beans to where disease is not causing yield reduction; and (3) amount of root rot and population of root rotting organisms as affected by different frequencies of irrigation.

Agron. 563, (W-12)

Ark. Control of Weevil and Curculio Injury to Cowpeas.
Develop measures for prevention of damage to cowpeas by
cowpea weevil and the cowpea curculio.
Ent., Hort., 271

Md. Chemical Control of Bean Insects: Evaluation of
Commercial Treatments and Investigations of New
Insecticides. To (1) evaluate present recommendations
for chemical control of bean insects under commercial
conditions; (2) determine effectiveness of new insecticides
for bean insect control in small plot tests; and (3)
obtain information on effectiveness of earworm control
on lima beans particularly regarding dosage and timing
of treatments.
Ent., Ag. Eng., Hort. H-29-L

T. H. Control of Insects of Truck Crops.--2. Beans. To
(1) determine biology and habits of insects of beans;
(2) determine susceptibility of insects involved to
most promising insecticides; (3) determine phytotoxic
effects of different insecticides on beans; and (4)
develop effective methods for controlling different
pests involved.
Ent., 954.2

Economics and Marketing

Miss. Carrying Quality and Consumer Preference Investi-
gations with Bush Snap Beans for Fresh Market. To learn
(1) relative carrying qualities and shelf-life of new
and leading varieties of bush snap beans for fresh
market; (2) consumer preference of varieties appearing
to have superior carrying quality.
Truck Crops, HA-7 3-4

Idaho Marketing Idaho Dry Beans. (1) Describe marketing
channels for beans including specific information on
movement to learn accurately the disposition of product;
services performed in preparing beans for market by
marketing agencies; charges by handlers in State. (2)
Analyze long term trends of bean industry with reference
to: acreage and yields; consumption; projection of future
trends in acreage, yield, and consumption, marketing
channel changes, variety changes.
Ag. Econ., 303

Md.

Marketing Maryland Snap Beans. To determine nature and extent of marketing facilities for handling snap beans, both fresh and for canning, and to examine influence of these organizations and facilities on net returns for snap beans to growers for fresh market outlet and canning, and design methods to improve existing organizations, facilities and practices.

Ag. Econ., ES 305

P. R.

Marketing of Pigeon Peas in Puerto Rico. To (1) determine problems of pigeon-pea producers in marketing their crop; (2) determine adequacy of practices and facilities available for processing or otherwise disposing of pigeon-pea crop; and (3) obtain any further information which may be of help in suggesting changes for improvement of pigeon-pea marketing practices.

Ag. Econ. 76

CABBAGE AND RELATED CROPS

Breeding

- Alaska Cabbage Breeding. To develop one or more early maturing, long standing, round headed cabbage varieties which possess superior culinary value and ability to hold up well in storage.
Hort., 7
- La. Cabbage Breeding and Intercrossing of Other Members of The Genus Brassica for the Purpose of Obtaining New Types With Regional Adaptability. To (1) obtain commercial types of cabbage adaptable to southern conditions; (2) cross members of the Genus Brassica and study mode of inheritance of certain characters; (3) select new types which are resistant to disease, heat and cold; and (4) determine new uses for crosses between members of Genus Brassica such as for food, feed, and oil products.
Hort., 277
- Miss. Testing, Selecting and Breeding Collards, and a New Study of Factors Associated with the Flowering Response. To (1) test available varieties for uniformity in plant type and productivity, (2) develop uniform type adapted to home and market use. (3) study influence of photoperiod, light intensity, temperature, and growth regulators on inducing and inhibiting flowering response.
Hort., Pl. Phys. HK-18, coop. USDA
- N. Y.
(Cornell) Breeding and Testing Crop Plants. C. Breeding Cabbage for Yield, Disease Resistance and Uniformity. To develop better varieties of important field and vegetable crops.
Agron., Pl. Path. Veg. Crops, Pl. Brdg. 116-c
- Pa. The Genetics of Cabbage, Brassica Oleracea L. Var. Capitata L., and Methods of Breeding the Crop. Studies will be made on the genetics of those characters having a direct bearing on the breeding procedures to be used particularly sterility. Selfed seed will be secured by bud pollinating "cold-treated" plants in the greenhouse. Breeding by backcross and by utilization of inbred lines for F₁ hybrid production will be studied and strains and hybrids of commercial value will be compared with standard varieties.
Hort. 1071

Culture

Alaska

Development and Storage Quality of Cabbage as Affected by Fertilization and Number of Plants to the Acre. To determine what effect the number of plants to the acre and the rate and method of fertilization have on 1. size of cabbage heads, 2. total yield of cabbage to the acre, and 3. keeping quality in storage.

Hort., Al-8

Md.

Influence of Nutrient Intensity and Balance on Growth, Yield, and Quality of Cauliflower. To learn (1) mineral nutrient levels in substrate and in plant for optimum growth and head production of cauliflower, (2) influence of nutrient levels in substrate and in plant on buttoning, (3) effects of various methods and times of application of different fertilizers as to nutrient content of plant and to plant growth and head production.

Hort., Pl. Phys. Q-79-H

Miss.

Fertilizer Evaluation With Particular Reference to Sulfur in Cabbage and Turnips. To determine (1) effect of using high-analysis fertilizers alone and with additions of sulfur on yield and sulfur content of cabbage and turnips on Verona sandy loam, shallow phase; (2) residual supplies of sulfur in various horizons of the soil and relate these to amounts of sulfur available to crops; (3) period of time needed for sulfur deficiency to develop in cruciferae crops on this soil under continuous use of sulfur-free fertilizer; and (4) amount of sulfur needed to correct deficiency if it occurs.

Hort. HK-23, coop. USDA

Va.

The Effect of Variety, Season, and Pruning on The Development and Nutritive Value of Broccoli Inflorescence and Leaves. To determine effect of 2 varieties (De Cicco and Early Green Sprouting), season (spring and fall), and time of leaf pruning (early or late) on growth and development and on ascorbic acid and carotene contents of broccoli central and lateral inflorescence and leaves.

Hort., Biochem. & Nutr. 86024

Processing and Utilization

N. Y.
(State)

Factors Involved in Darkening of Sauerkraut. To determine causes of darkening of color and development of certain off flavors in sauerkraut and to define these qualities on an objective basis.

Food Sci. & Tech. 3-d

Disease Control

Ill.

Plant-Virus Purification with Emphasis on the Curly-Top Virus and Its Relation to Horseradish Brittle Root and Degeneration. Purify and characterize curly-top virus. Learn cause of horseradish brittle root and degeneration. Develop disease control measures when causal agent of diseases is proven and characterized.

Pl. Path., Hort. 68-371, coop. USDA

Insect Control

Miss.

Cabbage Insect Control. (1) Test for effectiveness of insecticides against cabbage insects in commercial areas of State. (2) Develop insecticide applications that will control pest of cabbage and will conform to residue tolerance limits of Federal and State Pesticide Regulations. (3) Learn if cabbage worms are resistant to DDT. and State Pesticide Regulations. (3) Learn if cabbage worms are resistant to DDT.

Zool., Ent. HH-8, HZ-2

CUCUMBERS AND RELATED CROPS

Breeding

- Ariz. The Breeding and Improvement of Melon Varieties Adapted to Arizona. To (1) determine relative merits of all cantaloupe strains available now and in the future, (2) incorporate desirable characters within a melon variety adapted to Arizona, and (3) determine, by strain tests, adaptability, disease resistance, maturity, yield, and quality of varieties of honeydew and watermelon.
Hort. 295, coop. USDA
- Ark. Breeding and Selecting Watermelons. To secure an early maturing, wilt resistant variety or strain of watermelons, capable of producing high yields of melons with high table quality and adapted to the marketing methods used in Arkansas.
Hort., For. 207
- Ga. Breeding Watermelons for Disease Resistance and Market Needs. To develop resistance to Fusarium wilt, anthracnose, and other diseases in two types of watermelons. 1. high quality, refrigerator size melons, and 2. large melons of 30 to 40 lbs.
Pl. Path. 2
- Ga. Breeding High Quality type Cantaloupes Resistant to Disease, Insects, and Adverse Physical Environment. To breed a cantaloupe variety with good edible and shipping qualities that has enough resistance to all important diseases and insects to be profitably produced in any part of Georgia without the expense of spraying, irrigation, and extremely heavy fertilization.
Pl. Path. 38
- Mich. Breeding Muskmelons for Resistance to Fusarium Wilt, Alternaria Leaf-Spot and Mosaic. To develop a muskmelon of the same general type as Honey Rock, to which is added the factor for resistance to Fusarium wilt, caused by Fusarium bulbigenum var. niveum; and to incorporate resistance to Alternaria leafspot and mosaic into above material.
Bot. 35

Minn. Vegetable Breeding. 2. Squash and Cucumber Breeding.
To obtain varieties of cucurbits, better adapted to Minnesota growing conditions, to the producers requirements, and to the consumers needs and to make public new information on the crops.

Hort. 2110-2

Miss. Diseases of Cucurbits With Special Emphasis on Breeding Disease-Resistant Varieties of Watermelons and Cantaloupes Adapted to Mississippi Conditions. To (1) develop high quality watermelon resistant to Fusarium wilt and anthracnose, suitable to Mississippi conditions, and acceptable to shipping trade; and (2) develop commercial variety of cantaloupe resistant to downy mildew, powdery mildew, aphids and possibly to leaf and pickle worms.

Pl. Path. HL-1

Miss. Breeding, Selection and Variety Testing of Cucumbers.
To develop or find better varieties of pickling type cucumbers.

Hort. HK-3.

Mo. The Breeding of Vegetable Crops.---a. The Development of Commercial Watermelon Varieties for Commercial Production Adapted to Southeastern Missouri Conditions.
To (1) evaluate suitability of various varieties introduced from other sources for Missouri conditions; (2) cooperate in regional and national vegetable trials where desirable; and (3) to develop new varieties a. with superior nutritive value, b. of better market quality and adapted to modern methods of merchandising, c. more suitable for growing under mechanized farming, d. with better processing qualities, e. well adapted to various climatic conditions in several production regions, f. which are especially adapted to major soil types, g. resistant to diseases with no satisfactory method of control, and h. adapted to production on soils with high level of fertility coming from soil building practices and new knowledge of soil fertility.

Hort. 128-a

Ohio

The Development of Disease Resistant Strains of Cucumbers. To develop strains of cucumbers of slicing and pickling types which will be sufficiently resistant to mosaic and possibly bacterial wilt so that production of the crop may again become profitable to Ohio.

Bot. Pl. Path., 24

R. I.

Breeding Cucumbers and Melons for Resistance To Downy Mildew. To secure varieties of cucumbers and melons resistant to downy mildew, adapted to our climate, and of desirable shape, size and quality.

Hort. 506

R. I.

Breeding Watermelons to Combine Earliness of Maturity and High Quality With Rind Toughness. To obtain watermelons adapted to southern New England conditions possessing these characteristics; tough thick rind, high sugar, solid red flesh, good taste and texture qualities, dark seed color, and high production.

Hort. 507

R. I.

Breeding a Butternut Squash With A Thicker, Straighter Neck and A Smaller Seed Cavity. To obtain a squash adapted to southern New England conditions and possessing the following characteristics; thicker neck, straighter neck, and smaller seed cavity.

Hort. 508

Culture

Ariz.

Factors Affecting the Quality of Arizona Melons. To determine the nutritional requirements, irrigation requirements, and methods of improving storage life and maintenance of quality.

Hort. 296

Ga.

Quality and Nutritive Value of Cantaloupes as Affected by Levels of Nitrogen Fertilization and Irrigation Learn effects of irrigation and level of N fertilization on the chemical composition and edible quality of cantaloupes.

Home Econ. Hort. 87

Mi. Influence of Nutrient Intensity and Balance on The Quality and Physiological Defoliation of Cantaloupes.
To determine (1) level of mineral concentrations needed in substrate, and corresponding nutritional level necessary in the plant for greatest amount of growth and yield, and for highest quality, (2) effects of various methods and time of applications of mineral nutrients to obtain optimum concentrations in the soil and/or in the plant as determined from results in (1); and (3) influence of mineral levels in soil and in plant on physiological defoliation.

Hort.Q-79--c

Harvesting and Storage

Ariz. Melon Shipping Quality and Consumer Acceptability as Affected by Varieties, Growing Conditions, and Packing.
To find effect of varietal and growing differences on handling, storage, and transportation behavior and consumer acceptability.

Pl.Path. Nutr., Hort., Home Econ. P-308
coop. USDA

Fla. Watermelon Damage From Field to Car Loading.
To determine influence of handling methods and conditions of melons at harvest on damage and quality at shipping point.

Hort. 689 (SM-8), coop. USDA

Ga. Feasibility of Sizing and Hydrocooling as Practices for Improving the Marketability of Cantaloupes. To determine for cantaloupes (1) advantages and disadvantages of sizing and hydrocooling, (2) desirable procedures for sizing and hydrocooling, (3) desirable packaging and (4) sizes, varieties, and states of maturity desirable.

Ag. Econ. 83 (SM-8), coop. USDA

S. C. Reduction of Damage in Marketing Watermelons. To estimate losses from damage to watermelons in harvesting, hauling, and loading in railroad cars, and test methods for reducing these losses.

Ag. Econ., Hort. 51 (SM-8)

R. I.

Effect of Post-Harvest Treatment and Handling on Maintenance of Quality of Cantaloupes and Watermelons Marketed in the Northeast. Provide measures for preservation of quality which may serve as a basis for post-harvest handling of cantaloupes and watermelons. Develop, evaluate, and apply objective methods for determining quality and maturity of these products.

Ag. Econ. Hort. M-509, (NEM-18)

Processing and Utilization

Ga.

The Development of New Uses for Processed Watermelon and Cantaloupe Products. To learn (1) economical means of utilizing rinds as preserves, pickles, glazed rinds, candy centers, etc.; (2) uses of watermelon juice as a beverage, as a source of vinegar, other fermentable, or pharmaceutical material; (3) Use of cantaloupes as frozen product for cocktails and deserts, and as a constituent of pickles and preserves.

Food Proc., Hort. 9

Mich.

Thermal-Processing of Cucumber Pickles. (1) Develop methods where processors can evaluate pasteurization process. (2) Develop recommendations for continuous pasteurizing operations as heating and cooling cycle, temperature control systems. (3) Check present pasteurization recommendations under field conditions and develop pasteurization procedure for other pickle products where pasteurization is economical. (4) Develop new methods and equipment for studying thermal-processing and improving on present commercial methods. (5) Learn resistance of micro-organisms and chemical compounds to heat at different energy levels.

Ag. Eng., Ag. Econ. 818

N. Y.

(State)

Pure Culture Inoculation of Fermenting Cucumbers. To determine effect of various acid producing bacteria upon fermentation of cucumbers in brine.

Food. Sci. & Tech. 3-c

Vt.

Nutrient Value and Acceptability of Vermont-Grown Winter Squash. To learn (1) vitamin A and vitamin C value of Vermont-grown winter squash; (2) acceptability of different varieties of Vermont-grown winter squash.

Hort. 59

Disease Control

- Ala. Factors Affecting the Development and Control of Gummy Stem Blight of Cucurbits. To (1) determine factors affecting disease development of gummy stem blight; and (2) develop control measures for gummy stem blight.
Bot., Pl. Path. 550
- Calif. Insect Vectors and Plant Virus Diseases. D. Cucurbit Virus Diseases. To investigate: (1) insects responsible for spread of cucurbit viruses, (2) methods of insect transmission, (3) relationship and identity of various cucurbit virus diseases occurring with those that have been reported in the literature, (4) distribution of cucurbit viruses in the State and extent of damage on economic crop plants, (5) property studies of virus as aid to classification and differentiation, (6) host range of viruses including determination of weed reservoirs, ornamental host and susceptible economic plants, and (7) life history and host plants of insect vectors, including studies of insect movements, overwintering, and sources of insect populations.
Ent., Para., 657-D
- Fla. Cucurbit Mosaics on Vegetables and Other Plants. To determine mosaic viruses causing diseases of cucurbits, their host range, their insect vectors, and nature of the diseases in efforts to develop practical control measures.
Pl. Path. 538
- Ia. The Control of Cucumber Anthracnose by Means Other Than Foliar Fungicide Treatment. To obtain satisfactory control for cucumber anthracnose by some means other than application of foliar fungicides.
Pl. Path. 760
- Tex. The Cause and Control of "Pimples" A Serious Defect of Watermelons. To (1) establish cause of defect of maturing watermelons known as "pimples" "sand bumps" or "water bumps"; (2) determine how it spreads, and in what form and where inciting agent exists in winter; (3) learn what other plants harbor causal agent or show related condition; and (4) develop control measures.
Pl. Phys. & Path., Ent., Hort. 904

W. Va.

The Symbiotic Relationships Between Microorganisms and Insect Vectors of Plant Diseases. To investigate insect transmission of plant diseases as a distinct biological phenomenon fundamental to general sciences of plant pathology and entomology, especially to determine for cucumber beetles: (1) how cucumber wilt bacterium survives in the insect body, (2) if symbiosis is involved, (3) if bacteria are transmitted through eggs to larvae, (4) if bacteria survive pupal period and (5) if physiological condition or physical environment of beetles influence interrelations of vector and bacterium.

Pl. Path. 40

Insect Control

Ky.

Control of Insect Pests Affecting Cucurbits. To develop new control measures for the striped cucumber beetle, (Diabrotica vittata (F.)), melon aphid (Amphis gossypii)(Glov.), squash bug (Anasa tristis (Deg.)), squash borer (Melittia cucurbitae (Harr.)), pickleworm (Diaphania nitidalia (Stoll)), and melonworm (Diaphanis hyalinata (L.)).

Ent., Bot., Hort. 455

Mass.

Control of Insects on Cucurbits in Relation to Yield and Quality. To develop an effective, safe, economical program of pest control on cucurbits which will permit production of large yield of pest-free fruit without impairing its taste, texture, appearance, keeping or processing qualities.

Ent. 55, (NE-15)

Economics and Marketing

S. C.

Retail Marketing Methods and Facilities for South Carolina Watermelons. To learn (1) present methods for retail buying, storing, handling, displaying and selling watermelons. (2) consumer preference as to size, shape, variety, and preference as to whole or sliced melons; (3) possibilities for expanding retail market through new display and marketing methods in retail and chain stores.

Ag. Econ., Rur. Soc. 98

S. C.

The Economics of Early Summer Watermelon Production in The South Carolina Coastal Plains. Learn production practices and methods, labor, power and machinery requirements and costs and returns for watermelons.

Ag. Econ., Hort. 128

Tex.

Consumer Acceptance and Demand for Rio Gold Variety Cantaloupes. To (1) determine consumer acceptance and demand for Rio Gold variety cantaloupes in comparison with present commercial varieties, (2) appraise need for consumer educational aids to introduce and market Rio Gold cantaloupes, and (3) evaluate effectiveness of consumer educational or promotional aids in marketing Rio Gold cantaloupes.

Ag. Econ & Soc., Hort. 1005

LETTUCE AND OTHER SALADS AND GREENS

Breeding

- Ariz. Lettuce Breeding in Arizona. To (1) make strain tests, (2) breed new varieties, (3) maintain existing strains, and (4) study seed production, storage, and treatments.
Hort. 297, coop. USDA
- Idaho Breeding Spinach Resistant to the Curly Top Virus.
To (1) determine inheritance of resistance to curly top virus in spinach; and (2) develop through breeding, a new variety which will be resistant or commercially tolerant to curly top virus and of sufficiently high quality for the processing trade.
Hort. Pl. Path. 218
- N.Y.
(Cornell) Breeding and Testing Crop Plants. J. Breeding Celery for Disease Resistance. To develop better varieties of important field and vegetable crops.
Agron., Pl. Path. Ent., Veg. Crops, Pl. Brdg. 116-J
coop. USDA
- N. Y.
(Cornell) Lettuce Improvement. To study (1) breeding and selection of strains of Iceberg lettuce adapted to New York State conditions; (2) cultural practices best suited to desirable strains of Iceberg lettuce; and (3) reliability of certain sources of Imperial 44 lettuce.
Veg. Crops. 161, coop. USDA
- N. C. Lettuce Breeding. To develop heading varieties of lettuce that are tipburn resistant, desirable market types, and adapted to North Carolina conditions.
Hort. 79
- Tex. The Breeding and Improvement of Spinach Varieties for Texas, Including Resistance to Diseases. To (1) test domestic and foreign introductions of spinach and also all breeding material for resistance to white rust, downy mildew and virus diseases; and (2) develop varieties, through breeding and selection, resistant to white rust and other diseases, and acceptable for canning, freezing and fresh spinach shipping industries.
Hort.Pl. Path. 489, coop. USDA

Culture

- Ariz. Cultural Factors Affecting the Production of Arizona Lettuce. To study (1) nutritional requirements, (2) irrigation requirements, (3) seed and seedbed treatment to improve germination and emergence, (4) herbicides and weed control, and (5) pelleted seed.
Hort. 298, coop. USDA
- Ark. A Study of Amounts, Timing and Placement of Nitrogenous Fertilizers in the Production of Greens Crops. To learn (1) relationship between amounts, time of application and placement of varied nitrogenous fertilizers for greens crops, (2) if quality in crops is affected by amounts, timing and placement of fertilizers.
Hort., For. 417
- Mass. Production of Local Vegetables for Prepackaging. Study influence of fertilizer application and plant spacing, varieties, and similar factors on adaptability of local lettuce, spinach, and celery for prepackaging.
Oler. 91
- Pa. Chemical Weed Control in Spinach. To investigate weed control methods and techniques applicable to culture of spinach with special emphasis on use of chemical herbicides.
Hort. 1095-K

Harvesting and Storage

- Ariz. Lettuce Shipping Quality and Consumer Acceptability as Affected by Varieties, Growing Conditions and Packing. To find effect of varietal and growing differences on handling, storage, and transportation behavior and consumer acceptability.
Fl. Path., Nutr., Hort., Home Econ. 308A
coop. USDA
- Ariz. Marketing Arizona Head Lettuce With Special Reference to Packaging and Cooling Methods and to the Possibilities of Market Control Programs. To (1) study costs, margins, and efficiencies involved in harvesting, packing and shipping western lettuce, and the effects of type of container and method of cooling on comparative efficiency and costs; and (2) analyze interarea and interseasonal competition in lettuce marketing and describe major price determining factors in order to estimate probable results of voluntary and compulsory marketing agreements and prorates.
Ag. Econ. 316 (WM-14), coop. BAE

Disease Control

Calif.

Insect Vectors and Plant Virus Diseases.---C. Celery Virus Diseases. To investigate: (1) fluctuations in severity and prevalence of several virus diseases which make it important to acquaint celery growers with particular problems, (2) insect species responsible for spread of celery virus, (3) host range studies to search for host plants particularly among economic crop plants, weeds, or ornamentals which might serve as importance sources of virus for aphid vectors, and (4) severity of celery viruses in some areas which may make necessary investigations of possible means of control.

Ent., Para. 675 C

Utah

Diseases of Celery in Utah and Their Control. To determine occurrence, prevalence, destructiveness and etiology of diseases of celery; critical epiphytological factors for major celery disease pathogens; and develop control measures for most destructive.

Bot., Pl.Path., 282, coop. USDA

Culture

N. Y.
(Cornell)

Investigations of the Control of the Six-Spotted Leafhopper, The Vector of Aster Yellows in Lettuce. To determine the possibilities of controlling the yellows disease of lettuce through measures aimed at control of the leafhopper vector.

Ent., Veg. Crops. 93, coop. USDA

Oka.

Ecology, Seasonal Development and Control of Insect Pests of Spinach and Related Crops. To (1) study biology and seasonal abundance of Hylemya cilicrura, Heliophthis sp., Myzus persicae, Rhopalosiphum pseudobrassicae, Trichoplusia ni Pluetella maculipennis, etc., damaging greens crops; (2) test insecticide on fresh; unwashed greens at different periods after treatment; and (4) determine effect of various food preparatory processes upon depreciation of residues on crops.

Ent., Ag. Chem., Hort. 594

Economics and Marketing

Calif.

Costs and Efficiency in Harvesting, Packing and Shipping Western Head Lettuce. To determine how types of container, method of precooling, and work methods in harvesting, packing and shipping western head lettuce affect costs and efficiency.

Ag. Ec. 1572 (WM-14), coop. USDA

ONIONS AND OTHER ROOT CROPS

Breeding

Colo.

The Development of Onion Varieties and Hybrids Adapted to the Major Onion Growing Areas of Colorado.

(1) Incorporate resistance to pink root, purple blotch, and important storage diseases, (2) Obtain yields per acre higher than now obtained. (3) Select for high quality with emphasis on firmness and shape of bulb, outer scale color and ability to adhere during storage and handling, and lack of sprouting during storage.

Hort., Bot., Pl. Path. 44, coop. USDA

Idaho

Breeding Curly-Top Resistant Garden Beets and Swiss Chard. To develop curly-top resistant beets and Swiss chard of suitable quality for home gardens and commercial production in Idaho.

Pl. Path. 215, coop. USDA

Idaho

Breeding Hybrid Onion Varieties for Storage and Dehydration in Idaho. To develop (1) hybrid onion varieties having high yielding ability, improved appearance and storage quality, and resistance to certain diseases; (2) yellow or white hybrid onions having high yielding ability coupled with high solids content for use in dehydration.

Hort. Pl. Path., 253, coop. USDA

Idaho

Onion Breeding and Genetics. (1) Develop new, and improved existing male-sterile and inbred strains of onions by incorporate disease resistance, and resistance to adverse climatic conditions. (2) Develop Spanish type recessive white male-sterile onions. (3) Carry out basic genetic studies, quantitative and qualitative, and incorporate marker genes into inbred lines. (4) Carry out cytogenetic and genetic studies on Allium cepa x A. fistulosum hybrids and their polyploid derivatives. (5) Improve seed set on commercial bulb onions and on Bunching Type onions.

Hort., Pl. Path. 278, coop. USDA

Idaho

Male-Sterility and Its Inheritance in the Carrot, Daucus Carota. (1) Learn how male-sterility in carrots is inherited. (2) Develop male-sterile and maintainer lines for use in making F_1 hybrids. (3) Correlate genetic character male-sterility with any cytologic phenomena.

Hort. 279, coop. USDA

- La. The Culture and Breeding of Creole Onions. (1) Development of yellow and white varieties and strains for American market, strains will be selected from Red Creole, hybrids will be made between red and white and existing yellow varieties from these crosses yellow selections will be obtained; (2) establishment of high solid strains having high solid content so as to improve storage quality. Bulbs having high solids content will be selected and planted, progenies of each will be tested; (3) to breed varieties and strains which are resistant to downy mildew and pink root; (4) to develop male sterile lines to be utilized in production of hybrid onion seed; (5) work out most satisfactory cultural methods.
Hort. 411
- Mich. Control of Onion Diseases by Breeding for Resistance and by Other Control Measures. To develop onion varieties resistant to disease, particularly downy mildew, pink root and possibly smut.
Bot., Pl. Path., 5
- N. M. Improvement of the White Grano Onion by Inbreeding. To develop a strain which is superior in earliness, uniform maturity, broad obovate shape, small neck, yield, and uniformity in size and color.
Hort. 5
- N. M. Development of Hybrid Varieties of Onions of the Grano Type. To develop one or more first-generation hybrids that are superior to White Grano and Early Grano in the following: 1. yield; 2. uniform early maturity; 3. uniformity of size, shape and color; 4. resistance to bolting; 5. resistance to pink root disease; and 6. resistance to thrips injury.
Hort. 6
- N.Y.
(Cornell) Onion Breeding. To develop higher yielding, earlier maturing, better keeping onions with resistance to blast, thrips, and pink-root.
Pl. Brdg. 119, coop. USDA
- Ohio Evaluating Insect Resistance in Varieties and Strains of Onion. To (1) segregate varieties and strains of onion which are less susceptible to onion thrips and to onion maggot; and (2) develop a variety or varieties of onion which combine insect resistance with desirable horticultural qualities.
Ent. 7, coop. USDA

Utah

Onion Improvement. To (1) develop improved male-sterile and inbred strains of several onion varieties, including Yellow and White Sweet Spanish, for use in production of new onion hybrids; (2) test new varieties and selections, particularly new hybrids, for commercial possibilities; (3) carry out genetic studies on several plant and bulb characters, including fundamental studies on nature and inheritance of male sterility; (4) carry out cytogenetic studies of Allium cepa x A. fistulosum hybrids with particular attention to production of superior varieties of green bunching onions; and (5) breed for disease resistance with emphasis on resistance to onion pink root. Veg. Crops. 366, coop. USDA

Culture

Utah

Physiological, Ecological, and Chemical Studies of the Control of Weeds. To study (1) test for the oily residue (after stove oil sprays) in carrots and to adapt this test to a method for determining the rate of loss of the oil residue and the marketability of submitted samples of carrots, (2) location of the residue and methods for its removal, (3) correct stage for spraying onions, garlic, and such other vegetable crops as may submit to selective herbicidal action, (4) physiological or chemical basis for selectivity of herbicides, (5) fractionation of oils to identify the specific compounds responsible for the killing action, and objectionable flavors, (6) possible combinations that will kill the weeds without leaving an objectionable residue, and (7) systematic study of organic compounds that show selective herbicidal action.

Agron., Chem., Bot., Veg. Crops, 883

Harvesting and Storage

Ariz.

Carrot Shipping Quality and Consumer Acceptability as Affected by Growing Conditions and Packing. To find effect of varietal and growing differences on handling, storage, and transportation behavior and consumer acceptability.

Pl. Path., Nutr., Hort., Home Econ. 308-C
coop, USDA

N. Y.
(Cornell)

The Design of Farm Buildings and Accessory Equipment to Improve Efficiency, Flexibility and Serviceability and to Reduce Construction and Operating Costs. (1) Learn average stress grade of local timbers; evaluate end-restraint effect of timber connections and develop design procedures to use data; evaluate actual loads in farm buildings to compare with assumed loads used for design purposes; evaluate distribution of concentrated loads on floors; develop better methods for precutting and prefabricating farm buildings; test newly developed buttress design; test effectiveness of reinforcement in masonry walls; develop new methods of providing masonry walls; develop methods of providing masonry walls with additional stability, (2) learn desired rate of cooling and drying for onions; learn most desirable way to cool; learn depth of storage to prevent pressure deformation as related to cooling; devise new methods and evaluate new ones for handling to reduce bruising, skinning, and other damage and improve labor efficiency; learn pressure exerted on storage walls.

Ag. Eng., Hort. 109

Tex.

Treatment of Onions to Extend The Marketing Period. To (1) develop a commercially practical infra-red post harvest onion treatment; (2) construct an experimental moving belt-type infra-red onion treating apparatus; and (3) determine any detrimental effects a standardized infra-red treatment may have on keeping quality of untested commercial varieties.

Ag. Econ., Hort., Pl Phys. Path. 665

Disease Control

Idaho

Nature of the Influence of Certain Crop Residues on the Population and Pathogenicity of Onion Root and Bulb Rotting Fungi. To learn if addition of crop residues to infested soils suppresses activity of Phyrenochaeta terristris, Fusarium oxysporum and Botrytis allii by: direct antibiosis to pathogens, enhancing population of competitive saprophytes and of micro-organisms antagonistic to these pathogens.

Pl. Path., Hort. 300 (W-38), coop. USDA

Ill.

Epidemiology and Control of The Onion Bulb Nematode in Set Production. To obtain information and develop techniques that will permit confinement, control and if possible, eradication of this nematode where sets are grown.

Pl. Path., Veg. Crops. 68-379, coop. USDA

Mass.

Root Diseases of Parsnips and Control Measures.

To study (1) pathogens and environmental factors involved in the wastage of parsnips; (2) cultural and storage practices contributing to wastage of parsnips from disease; and (3) control measures.

Bot., 20

N. Y.

(Cornell)

The Bulb Nematode Disease of Onions. Learn host

range of onion bulb nematode. Study overwintering of nematode and nature and relation of onion set infection.

Pl.Path., Hort. 133-1,25

Insect Control

Alaska

Root Maggots in Alaska. To (1) investigate root

maggot incidence, wild host plants, dissemination and crop plant damage under various environmental conditions in field and laboratory, and to learn an effective means of control for turnip, seed-corn, onion, and other root maggot species which are, or may become, serious hazards.

Hort., Soils. 45, coop. USDA

N. Y.

(Cornell)

Studies of Insect Pests of the Onion With Special

References to Onion Maggot and Onion Thrips. To give attention to insect problems of onions as need necessitates.

Ent., Pl. Path., Veg. Crops. 94

SWEET CORN

Breeding

Iowa

Sweet Corn Breeding. To (1) develop inbreds with special emphasis on combining ability and quality, (2) explore possibility of using gene Sh_2 to increase quality, (3) test feasibility of using monoploid derivatives for producing homozygous lines, (4) develop European corn borer resistant or tolerant inbred lines, and (5) breed for resistance to Helminthosporium ~~muscum~~ and bacterial wilt and corn ear worm resistance.

Hort., Pl. Path. 1186, coop. USDA

Md.

Sweet Corn Improvement. To (1) originate and establish superior inbred lines of sweet corn; (2) test new lines in experimental crosses; and (3) compare new hybrids with established hybrids as to productivity, disease and insect resistance, ear quality and various plant characteristics.

Agron., Hort. B-44

Minn.

Corn Improvement. To study (1) production of improved hybrids for the various maturity zones in the State; (2) relative value of various methods of breeding; and (3) methods of field plot technique and improved practices.

Agron., Pl. Genetics 1311, coop. USDA

Miss.

Breeding, Variety Testing, and Cultural Studies With Sweet Corn. To develop (1) varieties of sweet corn better adapted to Mississippi conditions than those now available, and (2) more productive and profitable cultural practices.

Hort. HK-6

N. J.

Breeding Adapted Sweet Corn Hybrids for New Jersey. (1) Evaluate sweet corn varieties for fresh market use and freezing in the Northeast and evaluate inbreds. (2) Make up sweet corn breeding composites for Northeast within and among distinct maturities that may be inbred at various locations by individual breeders. (3) Produce promising hybrid combinations under a planned procedure and evaluate before inclusion of best in uniform trial. (4) Develop and apply better screening techniques for bacterial wilt resistance, pollen restoration capacity, heat resistance, and drought resistance.

Farm Crops, Food. Tech., 262 (NE-32)

N. Y.
(State)

Development of Improved Strains of Canning Crop Vegetables.---2, Breeding Early Yellow Sweet Corn of High Yield and Good Quality for Canning and Freezing.
To produce a superior, high yielding, early, yellow variety of sweet corn for canning and freezing.
Veg. Crops. 16-b

W. Va.

Corn Genetics and Breeding.---I, Corn Genetics.
To study (1) mode of attack, (2) chromosomal translocations with reference to linkage in chromosome 5, and (3) crossing-over in chromosome 1, in a special translocation stock.
Genetic., Pl. Path., Agron. 3, coop. USDA

Wisc.

The Development of Superior Strains of Hybrid Field and Sweet Corn. To develop superior strains of (1) field corn, that have suitable adaptation; produce a high yield of grain and silage, resistant to seedling, stalk, and ear diseases as well as to various insect pests; have capacity to germinate and give satisfactory stands and development under low temperature; and produce waxy and sun-red strains and (2) sweet corn for canning and market garden purposes.
Agron. 309

Harvesting and Storage

Ill.

Drying and Curing Problems of Seed Sweet Corn and Popcorn. To determine factors causing injury to sweet corn seed during artificial drying and to work out methods of artificially curing popcorn for market.
Hort. 65-340

Processing and Utilization

Iowa

Quality-Yield Price Relationships of Sweet Corn For Processing. To (1) establish relationship between the quality of raw and processed sweet corn, (2) learn the quality-yield relationship of sweet corn at both producer and processor levels, and (3) study present USDA grades for sweet corn for processing.
Hort. 1284 (NCM-13)

Insect Control

- Ark. Biology and Control of Corn Earworm. To study effect of environmental factors on seasonal history and abundance of corn earworm, as a means of improving control procedures and ability to anticipate damage, and also study materials and methods used in insecticidal control on major crops other than cotton, with emphasis on control in sweet corn.
Ent., 183
- Md. Chemical Control of Insect Pests of Sweet Corn. To improve present insecticidal methods of control of insects attacking sweet corn or to develop new and more efficient methods.
Ent., Hort., Ag. Eng. H-29-m, coop. USDA
- Md. Biology and Control of the European Corn Borer. To (1) determine incidence, distribution, and effectiveness of parasites that have been colonized against the borer, particularly *Lydella* and *Macrocentrus*; (2) gather data on seasonal abundance of first generation borers with the intent to correlate this information with climatology of several typical areas, the growth of corn, and abundance; and (3) study seasonal abundance to determine number of generations in several widely separated areas.
Ent., H-43
- N.Y.
(Cornell) Control of the Corn Earworm Attacking Sweet Corn in Eastern New York. (1) Develop methods and materials of greater value than those in current use. (2) determine levels of population potential for each season and relate information to county agents and growers. (3) Investigate possibility of developing so-called "resistant hybrids" for growing conditions in State. (4) Study all conditions that appear antagonistic to earworm population development, insect enemies, and diseases.
Ent., 171
- Pa. Biology and Control of the Corn Earworm on Sweet Corn. To (1) study life history and habits of corn earworm in Penna., (2) determine factors involved in timing of applications of insecticidal material for control, (3) test and compare various insecticides and their formulations to obtain commercially practical control of earworm, and (4) develop machinery which will satisfactorily apply to sweet corn the insecticides found to be of value against the earworm.
Zool., Ent. 1134

Economics and Marketing

- Fla. Economy of Marketing and Methods of Handling Sweet Corn for Long Distance Shipments. To determine methods of grading, precooling, packaging, shipping, and retailing sweet corn to maintain high quality most remunerative to growers.
Hort., Ag. Ec., Veg. Crops. 630 (SM-8), coop. USDA
- Ind. Quality-Price-Yield Relationships of Sweet Corn for Processing. To determine (1) relationship of prices and pricing methods of raw sweet corn to the quality and yield of canned sweet corn; and (3) evaluate present methods of selling raw sweet corn by growers to processors, and to ascertain possible improvement in U. S. grades for sweet corn for canning, to make grades more useful
Hort. 698 (NCM-13)
- Miss. Harvesting, Handling, and Marketing Practices of Sweet Corn in Mississippi and Their Effects on Quality and Price. To (1) appraise present marketing of sweet corn and compare situation here with that of competing areas; (2) analyze functions and services in movement of sweet corn to market, and learn effects of practices on quality and price; and (3) on basis of investigation, suggest ways and means to handle sweet corn to maintain quality at a reasonable cost.
Ag. Ec., Hort., HF-6, HK-21, HF-26, RRF A-5 (SM-8)
- N.J. Modern Methods of Marketing Sweet Corn. To study methods and results of precooling corn, especially precooling efficiently on small farms.
Ag. Ec., 35 (NEM-18)
- Ohio An Economic Analysis of Grower Contracts for Sweet Corn For Processing. To (1) analyze grower-canner contracts from standpoint of equity to each party and attainment of sound resource use; and (2) construct standards for such contracts that will improve grower and canner aims in efficient growing processing and selling canned sweet corn.
Ag. Econ. & Soc. 107 (NCM-13), coop. USDA
- Wisc. Quality-Price-Yield Relationships of Sweet Corn For Processing. To (1) determine relationship of prices and pricing methods of raw sweet corn to quality and yield at farm level, (2) learn relationship of prices and pricing methods of raw sweet corn to quality and yield of canned sweet corn, and (3) evaluate present methods of selling raw sweet corn by growers to processors.
Agron., Ag. Econ., 900 (NCM-13) 900

SWEET POTATOES

Breeding

- Ga. Improvement of Sweet Potato Varieties for Table Purposes Through Breeding. To obtain, through breeding or introduction, sweet potato varieties which have superior yielding ability, higher market and nutritive values, greater disease resistance and better adaptability for specific uses than presently known kinds.
Hort., Home Econ. 19, coop., USDA
- La. Comparing Promising Sweet Potato Seedlings With Standard Varieties for Market and Industrial Uses. To develop a variety that is superior to Puerto Rico, determining optimum conditions for production of promising material that is now available, and working with table varieties in preference to industrial use varieties.
Hort., Pl. Path., Ent. 417
- La. Breeding and Genetic Studies of the Sweet Potato. To (1) breed table type varieties that have the following desirable characteristics; uniform shape, high yield, high sugar and carotene content, storage ability, sprout production and cooking qualities, ideal type for fresh market, as well as for canning, etc.; (2) breed varieties and seedlings to be used as parents that are resistant to these diseases and insects: Fusarium wilt, soil rot, internal cork, nematodes and weevil; (3) study mode of inheritance of genetic characters and disease resistance; and (4) breed varieties higher in starch and yielding ability which could be used in making starch, feed, etc.
Hort. 527, coop. USDA
- La. Breeding Sweet Potato Varieties for Internal Cork Resistance. Further test and evaluate existing parental lines for resistance to internal cork. Collect and evaluate new lines which may be resistant to disease. Study mode of inheritance of resistance to internal cork. Evaluate new seedlings for commercial possibilities. Maintain and distribute internal cork resistant material.
Agron., Pl. Path. 866
- Md. Sweet Potato Breeding and Selection with Particular Reference to Quality and Resistance to Cracking. Develop varieties having resistance to cracking, incorporated with high quality of marketable roots before and after storage. Selections will be made with consideration of other characteristics required for commercial acceptability for fresh market and for processing.
Hort., Pl. Phys. Q-81-B

Miss.

The Breeding and Evaluation of Sweet Potato Varieties and Selections for Yield, Quality, and Disease Resistance. To find varieties of sweet potatoes which will produce higher yields of better quality, more total food per acre, and that will be better adapted for canning.

Hort., Br. Stas. HK-13, coop. USDA

N. C.

Sweet Potato Breeding and Testing. To (1) develop varieties of sweet potatoes with improved quality, high productivity, resistance to Fusarium wilt and internal cork, and desirable storage and sprouting characteristics, (2) evaluate experimental clonal lines and introduction for horticultural and processing characteristics, and resistance to Fusarium wilt and internal cork, (3) study factors affecting flowering and fruit setting (seed production), and specific combining ability in breeding stocks, and (4) investigate possibility of maintaining healthy stocks to be used as foundation seed: a. maintenance of old varieties, and b. maintenance of releases of new varieties.

Hort. 86, coop. USDA

Okla.

Improvement of Sweet Potatoes by Breeding. To (1) develop better varieties of sweet potatoes including a. greater production of marketable roots; b. more attractive shape and color of roots, c. greater nutritional value--especially carotene and ascorbic acid content, d. disease resistance, especially stem rot, e. improvement in keeping quality of roots and ability for sprout production. f. development of varieties with habits adapting crop to mechanized handling, g. development of highly productive high carbohydrate type for industrial use and feed; and (2) gain some knowledge of transmission of above characteristics from parent plant to its progeny.

Chem., Hort. Pl. Path., 596

S. C.

The Breeding and Improvement of Sweet Potatoes. To study (1) strains which are productive and free from disease and which produce roots of desirable shape and quality; (2) possibilities of creating homozygous strains constant for yield, root shape, and other factors; (3) development of new varieties and strains which combine earliness, disease resistance, productivity, and high quality.

Hort., Bot., 121, coop. USDA

- Tenn. Sweet Potato Improvement. To improve in quality and yield of the sweet potato crop in Tennessee through the selection of superior strains and through hybridization.
Hort. 122

Culture

- Fla. Effect of Various Levels of Fertilizers on Sweet Potato Production. To study the effects of rates of fertilizers on the yield and market quality of sweet potatoes.
Hort. 681
- La. Development of Machinery and Methods for the Planting Cultivating and Harvesting of Sweet Potatoes. To (1) develop a machine to cut and bundle vine cuttings from a field plant bed, (2) learn most practical methods and means for applying weed controlling chemicals when planting sweet potatoes, (3) develop satisfactory cultivating tools when using chemicals for weed control, (4) develop means and methods for gathering sweet potato vines for silage, (5) develop machinery for cleaning vines from the row before digging, without damage to potatoes, and (6) continue developmental work on harvesting and handling machinery to meet changes in needs of handling, grading and processing.
Ag. Eng., Hort. 846
- Md. Mineral Nutrition of the Sweet Potato With Special Reference to Cation Inter-Relationships. To determine (1) seasonal mineral nutrient uptake by sweet potato plant, and correlation of mineral uptake with enlargement of fleshy roots; (2) levels of mineral concentration in plant during growing season, associated with high crop yields; (3) effects of varying levels of cation nutrition and their interaction upon growth and yield of the sweet potato plant; (4) in field trials, the most effective methods, including timing and rate of application of mineral nutrients, to obtain optimum nutrient levels and yield response; and (5) response of sweet potato plant to minor element nutrition.
Hort. Q-79-F

Miss.

A Study of Fertility and Cultural Practices in Production, Effects of Certain Chemicals, and the Effects of Curing on the Storage Quality of Sweet Potatoes. To determine effects of (1) fertilizer rates and analysis on yield, sprout production, quality and storage of table type sweet potatoes; (2) "growth regulator" type chemicals on sprouting, quality and plant production of table type varieties in conventional storage; and (3) duration of curing upon eating quality.

Hort., Chem. HK-12

Mo.

Commercial Culture of Truck Crops and Greenhouse Vegetables.--d. Improvement of Commercial Sweet Potato Production. To (1) study and combat internal cork of sweet potatoes, an important threat at present; (2) find a practical method of breaking apical dominance of the root, thereby forcing slip production simultaneously at both ends of the root; (3) determine for each new line as introduced the number of days needed to obtain proper root sizing for the maximum percentage of marketable roots; (4) gain more information on proper relationship between nitrogen and potassium especially on sandy soils where they are present in a highly available form; and (5) determine to what degree irrigation may affect sweet potato yields under drought conditions.

Hort. 121-d

Harvesting and Storage

Md.

Effect of Modified Atmosphere Upon the Storage Behavior of the Sweet Potato. Learn effect of alteration of normal composition of atmosphere upon storage behavior of sweet potato. Prolong storage life of potatoes by exposure of roots during storage to atmospheric conditions to lower metabolic rate of root tissues.

Hort. Q-84

N.J.

Sweet Potato Storage Investigations. To determine effect of various temperatures and humidities during the curing period on the incidence of several diseases affecting sweet potato storage period and to consider effect of environmental factors occurring during holding period on keeping qualities and of increasing CO₂ and O₂ concentrations in storage house air.

Pl. Path. 461

N. C.

A Study of Certain Physiological Processes in the Sweet Potato in Relation to Curing and Storage.

(1) Learn rate of suberization and wound periderm formation in moist fleshed sweet potatoes under certain curing conditions. (2 and 3) Study rate of respiration in curing and storage and relation of rate of respiration to chemical quality, evolution of oxidizable volatiles during curing and storage and learn effect of their removal on rate of respiration.

Hort. HM-18

N. C.

The Effects of Environment, Curing and Storage on the Carotene and Ascorbic Acid Content of Several Varieties of Sweet Potatoes. The horticultural procedure involves study of variety and seed source, field arrangement, soil sampling, time and methods of planting, meteorological data, and time and methods of harvesting. Curing and storage procedures involve arrangement of samples during curing and storage, curing, storage, and records of weight changes. Sampling procedures involve time, number and size, and methods. Data to be collected include meteorological, horticultural, curing and storage, yield records, weight changes of roots during storage, and data from chemical analyses.

Hort. 84, coop. USDA

Processing and Utilization

Ark.

Vitamin A Value, in Terms of B Carotene, and Ascorbic Acid Value of Some Arkansas Varieties of Sweet Potatoes When Prepared for Eating. A Study of the Change in Vitamin A and Vitamin C Values During Cooking at Harvest Time, and After Three and Six Months Storage. To (1) prepare sweet potatoes for eating by generally used methods and determine carotene, vitamin A precursor, and ascorbic acid available at that time; (2) determine loss of vitamin A and ascorbic acid values during preparation with an idea of finding the relative value of the methods and of these varieties in this respect; and (3) establish factual data on vitamin A and ascorbic acid values really obtained from these varieties as they are eaten at different times of the year.

Home Econ. 308

- Ga. Study of Sweet Potato Processing. To (1) determine losses in weight during peeling, trimming and processing sweet potatoes of different U. S. grades, (2) evaluate methods of peeling, (3) evaluate methods of packing for canning or freezing, (4) determine most satisfactory medium for packing, and (5) develop means of using sweet potatoes in other food products.
Food Process., Hort. 22, coop. TVA
- Md. Changes in Chemical Composition of the Sweet Potato During Development, Storage, and Processing as Related to Quality of the Final Product. To learn (1) biochemical and chemical changes in composition of potato during development of fleshy root, during curing and storage, and after preparation for consumption by canning and baking, (2) varietal differences in composition and to relate such differences to storage behavior and to quality of canned and baked product.
Hort., Home Econ. Q-79-g
- P. R. Canning of Sweet Potatoes. To develop a process suitable for canning the different varieties of sweet potatoes grown in Puerto Rico.
Chem. 65
- Va. Quality Studies of Sweet Potatoes. To determine (1) nature of changes in carbohydrates in sweet potato during curing and storage; and (2) relationship of carbohydrate constituents and other components to sensory qualities of the baked roots.
Biochem., Nutr., Hort. 86032

Disease Control

- La. Diseases of Sweet Potatoes of the Rot Type. To study soil rot, black rot, and "round spot" of roots.
Pl. Path. 416
- La. A Study of the Internal Cork Disease of Sweet Potatoes. To make basic studies of internal cork disease of sweet potatoes necessary to permit eventual control of disease.
Pl. Path., Agron. 867

Md.

The Nature and Control of Sweet Potato Diseases Occurring in Maryland, Including Studies on Significance of Microbiological Antagonism. To (1) develop better methods to control diseases of economic importance; (2) undertake any studies needed to better understand the cause and control of sweet potato diseases; (3) study antagonistic effect of various organisms in relation to pathogens affecting sweet potatoes; (4) study use of antagonism as a commercial control of sweet potato diseases; and (5) if promising antagonistic organisms are found, to also study relation to other plant pathogens.

Chem., Bot., J-86-a

N. J.

The Control of Certain Sweet Potato Diseases by Treatment of the Potatoes and Sprouts. To (1) study sprout treatments for control of scurf and stem rot, (2) establish Actinomyces ipomeae (pox) in ground beds for further study, and (3) test boron as a possible control for sprout decay, and Fermate in plant bed soil to control the disease.

Pl. Path. 460

N. C.

Investigations on the Field Diseases of Sweet Potatoes. To (1) investigate the role of nematodes in sweet potato production and use of nematocides for their control, (2) survey horticultural and agronomic crops for strains of Fusarium oxysporium that are infectious to sweet potato, (3) establish value of vine cuttings in controlling black rot and scurf of sweet potatoes, and role of soil organic matter on longevity of the respective pathogens, Endocomidiophora fimbriata and Monilochaetes infuscans, (4) investigate mode of transmission, host range, diagnosis and physiology of internal cork disease and other viruses, and (5) study life cycle and economic importance of Fusarium surface rot.

Pl. Path. 91

P. R.

Sweet Potato Mosaic in Puerto Rico. To (1) determine specific nature and spread of sweet potato mosaic; (2) study natural means of propagation of the disease in the field, including insect vectors, if any, and intermediate plant hosts or reservoirs of the virus; (3) determine effect of mosaic on yield of sweet potatoes, and (4) devise control methods for combatting the mosaic.

Pl. Path., Gen. 61

Insect Control

- La. Investigation of the Sweet Potato Weevil and Other Insects Which Attack Sweet Potatoes in the Field and in Storage and the Development of Economical Means of Controlling Them. To study sweet potato weevil and other species--white grubs, wireworms, flea beetles, etc., which infest the growing crop and/or stored potatoes; and to develop satisfactory control program for the different species in various situations where damage occurs.
Ent., Hort. 447

- La. A Study of Insect Vectors of Internal Cork and of Foliage Feeding Insects of Sweet Potato. Learn vector(s), responsible for transmission of internal cork of sweet potato. Study biology and ecology of vector to learn methods of attack for its control. Develop control measures for vector. Learn effect of foliage feeding insects on yield and quality.
Ent., Agron., Pl. Path. 869

Economics and Marketing

- La. Economic Advantages and Disadvantages of Sizing Sweet Potatoes. To determine economic advantages and disadvantages of sizing sweet potatoes and indicate desirable procedure.
Ag. Econ. 807 (SM-8)

TOMATOES AND RELATED CROPS

Breeding

- Ark. Breeding and Selecting Tomatoes. To produce varieties or strains of tomatoes suitable in quality, yielding ability, and disease resistance to the needs of tomato growers in Arkansas.
Hort., For. 206
- Colo. The Improvement of Canning Tomatoes. To (1) develop by hybridization a new early tomato variety or hybrid for Northern Colorado that will meet requirements for canning; and (2) test field seeding methods, improved fertilization practices.
Hort. 42, coop. USDA
- Ga. Breeding Pimiento for Disease Resistance and Ability to Set Fruit Under Climatic Conditions of Georgia. To (1) develop a stable and productive strain of pimiento for canning, producing fruit of the desired size and shape, and (2) incorporate into this strain resistance to some of the more destructive diseases.
Hort., Pl. Path. 15
- Idaho Control of Curly Top on Tomato by Breeding. To breed tomatoes of suitable commercial quality that are resistant to the disease.
Pl. Path. 212, coop. USDA
- Ind. Breeding of Disease Resistant Varieties of Tomatoes. To determine disease resistant parental stocks and the manner of inheritance of such resistance and to develop suitable commercial varieties resistant to Fusarium wilt, defoliation, stem cankers, anthracnose fruit rot, leaf mold, the virus diseases and others.
Bot., Pl. Path. 322
- Ind. Genetic and Chemical Studies in the Breeding of Tomatoes for Higher Vitamin Content. To (1) develop improved red and orange varieties of tomatoes of high vitamin C and provitamin A content; (2) determine genetic basis of inheritance of various tomato fruit pigments and related colorless polyenes; and (3) clarify chemistry of tomato fruit pigments and related polyenes.
Biochem., Bot., Pl. Path. 738

- Minn. Vegetable Breeding. --1. Tomato Breeding. To obtain better varieties of tomatoes as regards earliness, fruit type and yield, and to publish information that will add to general knowledge of the crop.
Hort. 2110-1
- Miss. Breeding Tomatoes and a Study of Factors Associated With Fruit Set and Quality in a Crop Grown Under High Temperatures. To develop variety that will set and develop high quality fruit under high temperatures; (2) develop variety with strong erect stem that requires minimum training to hold fruit off the soil; (3) develop variety with fresh market and canning quality; and (4) determine methods of improving fruit set under high temperature.
Hort. HL-13, PK-4
- Miss. Nematode Resistance in Peppers. Investigation of resistance to root-knot nematodes found in certain strains of pepper. Determine mode of inheritance of resistance. Transfer, if found feasible, such resistance to commercially desirable varieties of pepper.
Pl. Path. & Phys. HL-12, RRFL-2
- N. H. Improvement of Chile(Capsicum Annuum), For Pod Type, Yield, Earliness, Pungency and Resistance to Disease. To (1) develop one or more new varieties of chile which combine better characters of College No. 9, College No. 6, and "Native" varieties, including early maturity; high yield; large, smooth pungent pod; etc.; and (2) complete improvement of a strain of No. 6 type which will be suited for use as fresh green vegetable and for commercial canning and freezing, with such characters as long, smooth, fleshy pod; early maturity; and high yield.
Hort. 21
- N. C. Breeding Productive, High Quality, More Disease-Resistant Tomatoes for North Carolina. To develop productive, high quality varieties and strains that are resistant to major tomato diseases in North Carolina.
Hort. 85, coop. USDA

- N. D. Breeding Tomatoes for Earliness, Yield, Size, Quality, Ascorbic Acid Content and Disease Resistance. -- To develop improved tomato varieties or hybrids for North Dakota with respect to early maturity, yield, size and shape of fruit, quality, high ascorbic acid content, disease resistance, and adaptation to a wide range of soil and climatic conditions.
Hort., 12-3, coop. Univ. of New Hampshire
- Ohio Disease and Insect Resistance in the Tomato. A Breeding Project. To (1) develop varieties of tomatoes, resistant to Fusarium wilt, leaf mold, mosaic, and Septoria and Alternaria leaf spots by combining genes for resistance in wild species with genes for desirable qualities in domestic species; (2) study fungi causing diseases from standpoint of physiologic races and their distribution; (3) isolate differential accessions for identification of physiologic races of above disease producing organisms; (4) evaluate developed accessions for resistance to insects which attack glasshouse- and field-grown tomatoes; and (5) study nature of resistance to disease to determine loci on chromosomes of the genes which govern resistance and to conduct embryological studies to determine cause, nature, and degree of incompatibility in interspecific hybrids within genus *Lycopersicon*.
Bot., Pl. Path. 37, coop. USDA
- Ohio Cytogenetics and Embryology of the Domestic Tomato, The Wild Species of Tomato and Their Hybrid Derivatives in Relation to Disease Resistance, Hybrid Sterility and Self Incompatibility. To study (1) pollen tube growth, fertilization, embryo and endosperm development in tomato, its wild relatives, and interspecific hybrids derived from them; (2) chromosome number and behavior in interspecific hybrids of tomato and their derivatives; (3) genetics of self-incompatibility in genus *Lycopersicon*.
Bot., Pl. Path. 37-1, coop. USDA
- Penna. Genetics and Cytogenetic Studies in *Capsicum Frutescens*. The Cultivated Pepper. To determine (1) how available material may be used in breeding new commercial varieties or improving standard varieties; (2) F_1 combining ability of pepper varieties and strains; (3) feasibility of using F_1 or F_2 generations for commercial production; and (4) amount of natural crossing in pepper, and isolation required to obtain true breeding stocks.
Hort. 1049
- Penna. Genetic and Cytogenetic Studies in the Tomato *Lycopersicon Esculentum*. To study (1) breeding of new commercial varieties and improving standard varieties; (2) feasibility of using F_1 , or F_2 generations for commercial production; and (3) genetics and cytogenetics of *L. pimpinellifolium*, *L. peruvianum* and *L. hirsutum*.
Hort. 1048

- P.R. Tomato Breeding. To develop by breeding and selection varieties suitable for the local and export market, especially adapted to grow during the late spring and summer months.
Pl. Brdg. 49
- R. I. Breeding of an Earlier Tomato With Non-Cracking Fruits and More Abundant Foliage. To (1) secure earlier maturing tomatoes of desirable market size and shape, free from cracking; (2) secure larger foliage area of early tomatoes which should increase yield; and (3) combine high quality with freedom from cracking.
Hort. 505
- S. C. Breeding of Pungent Peppers. To develop one or more varieties of the Cayenne type having highly productive and disease resistant plants and pods of desirable size and shape which are easily picked and dry uniformly and producing a ground product which retains its color well in storage and possesses a high capsaicin content.
Hort. 15
- S. D. Production and Breeding of Early, Drought and Disease Resistant, High Quality Tomatoes for Home Use. (1) To determine best cultural practices to secure early tomatoes; and (2) to develop by hybridization tomato varieties which combine drought and disease resistance with earliness and high vitamin C content.
Hort. 49
- Tenn. The Development of Tomato Varieties Resistant to Fruit Rots. To (1) find and develop tomato lines having late blight-immune foliage; (2) find and develop tomato lines with buckeye-rot-resistant fruit; (3) combine, in a commercially acceptable variety, late blight, buckeye-rot and wilt resistance; also leafspot or other desired resistance; and (4) test and develop immunity in edible tomato-like relatives, especially Cyphomandra, Solanum, and Physalis species; and in possible crosses of these with tomato.
Pl Path. 134
- T. H. Tomato and Sweet Pepper Improvement and Genetics. Develop locally adapted tomato varieties with increased disease resistance and superior horticultural qualities as: plant vigor, upright habit, earliness, improved vitamin C content, commercial fruit size, multiple disease resistance, etc.
Veg. Crops, Food & Nutr., Pl. Path. 816

- Tex. Breeding Tomatoes for Resistance to Diseases.
Develop (by breeding and selection) high yielding,
good quality types of tomatoes resistant to major tomato
diseases occurring in Texas.
Pl. Path. Hort. 554, coop. USDA
- Tex. Breeding Commercial Shipping and Canning Varieties
of Tomatoes for South Texas. (1) To study the adaptability
of tomato varieties to south Texas and to determine which
of these varieties merit further breeding and selection.
(2) To develop tomato varieties through breeding combining
earliness, high yields, and market and consumer acceptance
that are adapted to commercial production for shipping in
south Texas. (3) To develop tomato varieties adapted to
growing conditions in south Texas suitable for commercial
canning. (4) To incorporate resistance to the diseases
and physiological abnormalities which seriously limit
commercial canning. (4) To incorporate resistance to the
disease and physiological abnormalities which seriously
limit commercial production in south Texas.
Hort. Pl. Path. 1026, coop. USDA
- Utah Breeding for Resistance to Curly Top of Tomatoes.
To (1) develop varieties of tomatoes that are resistant
to curly top disease and equal to present day commercial
tomato varieties in fruit quality, earliness, and yield,
and (2) study inheritance of curly top resistance and
other characters, so as to develop better varieties.
Pl. Path. 330, coop. USDA
- Wash. Breeding for Curly Top Resistance in Vegetable Crops.
To produce commercially acceptable and home garden strains
of tomatoes resistant to curly top disease.
Hort. 1017
- W. Va. Improvement of Tomato Varieties for West Virginia.
To (1) select by extensive testing, tomato varieties with
resistance to late blight and other diseases, insects of
unfavorable environal factors commonly found in W. Va.;
(2) incorporate these resistant characters into high
yielding and high quality tomato varieties adapted to the
growing conditions of W. Va. by crossing backcrossing and
selection, in both field and greenhouse; (3) determine
nature, variability and method of inheritance of
resistance to tomato diseases and to injuries by insects
and environmental factors; and (4) study pathogens for
occurrence of pathogenic races and study any phase of
diseases fundamental to program.
Pl. Path., Hort. 34

Varieties

Ohio

The Evaluation of the Collection of Domestic and Wild Species of Tomato, and the Maintenance of the Desirable Accessions and Valuable Breeding Stocks. To (1) evaluate and isolate desirable accessions, from the mass collection of 1500, which possess valuable germ plasm; (2) maintain and make available to others interested in tomato breeding work seed or asexually propagated clones of this collection of tomato accessions; and (3) to insure that this germ plasm is constantly available to current and future needs in tomato breeding.
Bot., Pl. Path. 72 (NC-7)

Culture

Ga.

The Effects of Placement Depth and Location of Fertilizer Upon the Growth and Yields of Pimiento and Other Vegetable Crops. (1) Learn effect of placement depth and location of fertilizers on growth and productivity of pimiento and other vegetables, (2) Devise equipment and methods for efficient placement of fertilizer at optimum depths.
Hort., Ag. Eng. 115

Ky.

The Interrelationship of Hormones and Nutrients and Their Effect on the Production and Quality of Tomatoes. To determine (1) interrelationship of hormones and nutrients in set and quality of tomatoes, and (2) if proper balancing of nutrients will not induce set under adverse conditions as efficiently as do hormones.
Hort. 551

Ky.

The Effect of Timing and Balancing Mineral Nutrients on the Growth and Quality of Tomatoes. Study growth of plant as influenced by applications of different amounts of fertilizer, learn best time and method for applying each and note correlation between amount of nutrient absorbed by plant and quantity applied to soil and response of plants on different nutrient levels to supplemental irrigation.
Hort., Ag. Eng., Soils, 556

- Md. Influence of Nutrient Intensity and Balance Upon the Yield and Quality of Tomatoes. To determine (1) levels of mineral concentration needed in the plant, and corresponding nutrient levels needed in substrate for highest yield and quality; (2) influence of mineral levels in soil and in plant upon physiological defoliation; and (3) in field trials, the most effective methods and rates of application of mineral nutrients at different stages of growth to obtain optimum nutrient levels in plant as determined above.
Hort. Q-79-E
- Mass. Nitrogen and Temperature Relationships in Greenhouse Tomatoes. (1) Learn effects of varying N levels, and day and night temperatures on vegetative growth, fruit setting, quality, and yield of greenhouse tomatoes.
Oler. 89
- Mo. Commercial Culture of Truck Crops and Greenhouse Vegetables.--e. Cultural Practices for the Processing Tomato Crop in Southwest Missouri. To (1) conduct a tomato improvement project similar to that of last year in 4 additional counties; (2) concentrate experimental plots at canning centers on several different soil types; (3) field test several new insecticides and fungicides; and (4) study graded quality with more emphasis than in the past.
Hort. 121-e
- N. J. The Fruiting Habit of Three Tomato Varieties. Develop method for predicting yield and rate of fruit maturity. Learn if correlation exists between reproductive structure development in early part of season and harvests later in season. Study effect of removing reproductive structures which develop late in season on size and rate of maturity of earlier fruiting structure.
Hort. 329
- N. J. Cracking Studies of the Tomato Fruit.---Learn what makes tomato fruits crack.
Pl. Phys. Bot., Hort. 367
- N. J. Ion Relationships in Plants and Soils. Learn effects of Ca/K ratios on yields and composition of tomato fruit, factors affecting canning qualities of tomato fruit, and effects of clay mineral variations in soils as they influence the release of ions to tomato plants.
Soils 628

Harvesting and Storage

- Ark. Study of the Relationship of Post Harvest Storage Temperature to the Development of Quality in Tomatoes Harvested After the Inception of Red Color. Study influence of post harvest storage temperatures on ultimate qualities of tomatoes harvested at turning and pink stages of maturity, and to strive for a practical refrigeration schedule for maximum development and retention of good table quality.
Hort., For., ES 470
- Fla. Maturity as Related to Quality of Tomatoes for the Fresh Market. To determine the effects of maturity on market quality of tomatoes and to improve the method of grading for maturity.
Hort. 641
- Fla. Relationship of Heredity to the Ripening Performance of Tomatoes. To determine differences in ripening behavior and marketability of varieties and strains of tomatoes during the ripening processes.
Hort. 642
- Fla. Post-Harvest Effects of Temperature, Light, Storage Atmosphere, and Humidity on Tomato Quality. To study ripening behavior and quality of tomato fruits as affected by post harvest environmental factors, especially temperature, light, storage atmosphere and humidity.
Hort., Home Econ. 643
- S. C. The Causes and Prevention of Discoloration. In Stored Pungent and Paprika Peppers. To (1) develop a quick test to predict color stability on aging; (2) develop a practical method of preventing discoloration; and (3) determine more important chemical reactions that take place in discoloration of cayenne pepper and paprika.
Chem., Hort. 45
- Tex. Evaluation of Alternative Vegetable Handling Methods. To determine feasible methods and relative costs of maintaining quality through marketing channels with an emphasis on tomatoes.
Ag. Econ. & Soc., Hort. 852 (SM-8)

Processing and Utilization

- Calif. Pigmentation in the Tomato and the Color of Processed Tomato Packs (Including Solid Pack, Stewed Tomato, Juice, Paste and Catsups).--- To (1) control nature and quantity of natural pigments of tomato; and (2) evaluate results in terms of color of processed product, and determine factors controlling grade of final product.
Food. Tech. Gen. Agron., Veg. Crops. 1545

- Ill. Steam Injection for Practical Prevention of Film Formation in Evaporating Hot Broken Tomato Juice. Find best design and method of operation of stem injection for use in commercial plants to prevent film deposition in concentration of hot broken juice.
Food. Tech., Ag. Eng. 50-386

- N. Y.
(State) Chemistry of Pectin and Pectic Enzymes. The mechanisms by which the pectic constituents of fruits change are unknown. Information is sought (1) on the mechanism of pectic transformation in fruits in vivo, (2) on the mechanism of the known pectic changes which occur when fruit tissues are macerated as in the manufacture of many food products. Tomatoes and apples are the chief present objects of this investigation.
Food. Sc. & Tech. 2a

Disease Control

- Ark. Etiology and Control of Seed-Borne and Soil-Borne Disease of Tomatoes. To (1) determine importance and distribution of various diseases, (2) study effect of cultural practices, soil types, and varieties as related to the incidence and control of diseases of tomatoes; and (3) determine variability in virulence and adaptability of pathogens existing under Arkansas conditions.
Pl. Path. 298

- Calif. Diseases of Truck Crops. Research on control of spotted wilt in tomatoes by development of a resistant variety and use of DDT to control the thrips that transmit the spotted wilt virus.
Pl. Path. 980

- Fla. The Resistance of Peppers, *Capiscum Frutescens*, L., Virus Diseases. To test a world wide collection of peppers for resistance to virus diseases.
Pl. Path. 574
- Fla. Virus Diseases of Tomatoes. Study virus diseases of tomatoes with respect to identification, insect vectors, distribution and field sources.
Pl. Path. 741
- Ga. Control of Diseases of Pimiento Pepper and Other Vegetables. (1) Develop better control measures for diseases of pimiento pepper. (2) Learn nature and seriousness of diseases present on other vegetables of importance to local canning industry and develop control measures if warranted. (3) Assist horticulturists with variety testing of vegetables by making disease determinations and ratings.
Pl. Path., Hort. 50
- Ill. The Effects of Certain Fungicides and of Defoliation Caused by Diseases on the Composition of Tomato Fruit and the Preservation of Tomato Products. To determine (1) amount of Cu, Zn, and other basal components of fungicides absorbed by tomato foliage and translocated to the fruit; and (2) effect of these components and the presence or absence of defoliation on total acidity, pH, total solids, soluble solids, total sugars, ascorbic acid, color, viscosity, mold count, and other constituents of canned tomato juice and other tomato products.
Hort., Food. Tech. 50-367
- Miss. Investigation of Pepper Diseases and Their Control Under Mississippi Conditions. To (1) determine diseases on peppers in state and relative crop damage, (2) seed control of major diseases of economic importance, (3) survey all seed stocks for possible resistance and incorporate desirable resistance into suitable types, and (4) develop techniques for rating disease reaction.
Pl. Path. HL-9
- N. H. Testing Tomato Varieties for Resistance to the Late Blight Pathogen. To test completed tomato crosses and selections of marketable types for resistance to the late blight pathogen, Phytophthora infestans.
Bot. 34

- N. J. Tomato Diseases and Their Control. To investigate by recognized pathological methods the cause of the internal browning and to attempt reproduction of the symptoms under controlled conditions.
Pl. Path. 462
- Ohio Biology of the Tomato Early Blight Organisms With Reference to the Existence of Races and Resistance. To (1) determine existence of physiological races of A. solani, A. tenuis, and A. tomato, (2) study parasitism of above fungi to determine if small necrotic lesions constitute resistance or susceptibility to the parasites; and (3) screen tomato P. I. accessions for resistance to above organism.
Bot., Pl. Path. 72-2A, (NC-7)
- Ohio Control of the Mosaic Diseases of Tomatoes. To (1) develop a method to control mosaic diseases of tomatoes caused by Marmor tabaci, var. vulgare, and other viruses; and (2) study basic principles of tobacco mosaic virus and other viruses involving isolation and purification of virus, study in vitro, and parasitism of virus.
Bot. Pl. Path. 86
- Pa. The Internal-Browning Disease of Tomatoes.---A. The Relation of Viruses to the Disease Known as Internal-Browning of Tomatoes. To (1) determine nature of the disease of tomato known as internal-browning, and (2) develop satisfactory control measures.
Bot. 1170-A
- Pa. The Internal-Browning Disease of Tomatoes.---B. The Relation of Inherent and Certain Environmental Factors to Internal-Browning of Tomatoes. To determine (1) influence of varied nutrition and moisture levels on incidence of internal-browning in tomato varieties and hybrids; and (2) extent of inherent susceptibility or resistance to this disorder.
Hort. 1170-B
- Wash. Fruit Spot and Related Physiological Disorders of Fruits. To study fruit spot and related physiological disorders of fruits to determine cause and get data on value in the control of such disorders.
Hort. Pl. Path. 426

Insect Control

- Md. The Drosophila Problem in the Canning of Tomatoes. To (1) gain further information on source of infestation by eggs and larvae in field, transit and factory; (2) determine effectiveness of insecticides in control of adult flies in field, in transit and at canning plants; (3) study washing equipment with emphasis on high pressure washes for removing eggs and larvae from cracked fruit and to observe effects of such washes on mold count in canned product; and (4) study methods of refuse disposal relative to Drosophila breeding. Ent., Hort., Ag. Eng. H-29-K

S. C.

Bionomics and Control of Heliothis Armigera (Hubner)
As A Pest of Corn and Tomatoes. To determine factors in life history of the insect influencing its control, study physical properties of diluents and ways in which their effectiveness and usefulness may be increased, and test under field conditions combinations of chemicals and diluents showing promise of control in laboratory studies.

Ent. 123

Economics and Marketing

Ga.

Marketing Vine-Ripened Georgia Tomatoes. Learn (1) costs and margins in moving pink and green-wrap tomatoes from farmer to retail stores, (2) time pink tomatoes will "hold up" in market, (3) loss from deterioration of pink and green-wrap tomatoes in marketing channels, (4 & 5) distance from producing area pink tomatoes could be marketed and response of consumer to such a marketing practice, (6 & 7) reaction of producers to selling pink tomatoes and months they could be made available, (8) present and potential production areas in State applicable to such a practice, (9) economic significance of such a marketing practice to farmers in Georgia.

Ag. Econ., Hort. 93

Ind.

A Unit Color and Defect System for Purchasing Cannery Tomatoes. To determine applicability of Purdue Sampling Table and Purdue Color Meter to improvement of precision in assigning U. S. grades to tomatoes for processing; (2) establish a unit of color and a unit of defect, and using them, develop a method to buy and sell tomatoes on unit color and defect system; (3) ascertain advantages to grower and canner by such a system of pricing tomatoes; and (4) make improvements possible in devices used.

Hort. 710

Ind.

Marketing of Indiana Tomatoes and Tomato Products. To (1) evaluate contributions other merchandising methods can make in improving the competitive position of Indiana tomato processors, (2) conduct experimental program designed to help merchandising practices, (3) learn level of processing efficiency which tomato processors in Indiana must achieve to compete with processors in other areas, (4) evaluate conditions which may develop in production and processing industries in the next 10-15 years if no research and development program is used.

Ag. Econ., Hort. 838

MUSHROOMS AND OTHER CROPS

Culture

Ohio

The Effect of Adding Certain Vitamins of the B Complex Singly in Several Combinations on Mushroom (*Agaricus Compestris* L.) Production and on Their Vitamin Content. To determine effects of (1) adding B-vitamins, singly and combined, at different concentrations and at different times on rate of growth and total yield of mushrooms, (2) mixing certain commercial organic by-products high in B-vitamins with manure for increasing yields, and (3) treatments on vitamin content of mushrooms.

Hort. Anim. Sci. 27

Pa.

Nutrition, Development and Pathology of Commercial Mushrooms. To (1) develop improved nutrient substrate, (2) determine effect of soil casing on physiology, (3) develop superior strains, (4) determine factors controlling size and quality of sporophores, (5) determine influence of volatile substances on growth, and (6) determine nature and cause of certain diseases.

Bot. 756

Processing and Utilization

Ga.

Processing Okra. To (1) determine most satisfactory means of preserving or processing okra, (2) investigate means of mechanically separating tender and hard okra for marketing or processing.

Ag. Econ. ES 335

Insect Control

Pa.

The Biology and Control of Animal Pests Affecting Cultivated Mushrooms. To study the biology and most effective and economical measures for the control of the insects, mites, and nematodes which reduce the mushroom crop.

Zool., Ent. 714

Economics and Marketing

Pa.

Merchandising of Processed Mushrooms. To learn (1) consumer attitudes associated with level of consumption of processed mushrooms, (2) extent of consumer knowledge concerning potential ways of using processed mushrooms, (3) effect of various merchandising practices, developed from findings, above, on sales of processed mushrooms.

Ag. Econ., R. Soc. 1172-E, (NEM-16)

REGIONAL PROJECTS

NCM-13

Quality-Price Relationship of Sweet Corn for Processing.

1. To determine the relationship of prices and pricing methods of raw sweet corn to the quality and yield at the farm level. 2. To determine the relationship of prices and pricing methods of raw sweet corn to the quality and yield of canned sweet corn. 3. To evaluate present methods of selling raw sweet corn by growers to processors.

Cooperating stations and agencies: Ind., Iowa, Minn., Ohio, Wisc., USDA

NC-7

The Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants for Industrial and Other Purposes and for the Preservation of Valuable Germ Plasm of Economic Plants.

1. To cooperate in a coordinated program of plant explorations, both foreign and domestic, to obtain plant materials and to determine their potential value for industrial and other purposes. 2. To establish and maintain a primary regional introduction station with adequate facilities and personnel to handle introduced and domestic seed and plant materials adapted to the ecological conditions of the North Central Region and to establish secondary stations when necessary. 3. To initiate a program of cataloging, preserving, multiplying, and distributing introduced and domestic seed and plant materials of potential value within the region.

Cooperating stations and agencies: Ill., Ind., Iowa, Kans., Minn., Mo., Nebr., N. D., Ohio, S. D., USDA

NC-10

Eradication or Control of Weeds and Other Undesirable Plants.

To devise or discover and improve means of eradicating or controlling undesired plant growth with maximum efficiency and minimum injury to associated desirable plants, animals and man. The areas involved are in field crops, vegetable crops, gardens, cultivated lands, pastures, lawns, cemeteries, recreational areas, roadsides, forests, right-of-ways, waste land, drainage and irrigation ditches, ditch banks, ponds and other aquatic areas, and other locations where weeds are a problem.

Cooperating stations and agencies: Ind., Iowa, Mich., Nebr., N. D., Ohio, S. D., Wisc.

NEM-16

Marketing Northeastern Agricultural Products Through Processing Plants. 1. To determine cost relationships and improve plant efficiency in the processing of fruits and vegetables. 2. To determine, compare, and evaluate procurement practices among processors for the improvement of grower-processor relations and increase the utilization of Northeastern production. 3. To test consumer responses to merchandising technique and promotional programs for the distribution of Northeastern processed products.

Cooperating stations and agencies: Me., Md., Mass., N. J., Pa., USDA

NEM-18

Quality Maintenance and Prepackaging in Marketing Fresh and Processed Vegetables. 1. To develop improved methods of handling, packaging and storage in order to maintain quality in marketing fresh vegetables. 2. To develop objective measures of quality for fresh and processed vegetables. 3. To determine consumer and trade acceptance and preference for specific marketing practices and their results.

N. J., N. Y. (Cornell), R. I.

NE-12

Influence of Environmental Factors on the Effectiveness of Herbicides. 1. To determine the influence of several climatic and soil factors on the effectiveness of representative chemicals from among the major groups of chemicals now used as selective herbicides. To determine physiological, chemical, and other changes in plants induced by the use of these herbicides.

Cooperating stations and agencies: Conn. (Storrs), Del., Me., Md., Mass., N. H., N. J., N. Y. (Cornell), Pa., R. I., W. Va.

NE-15

The Effect of Pesticides on Quality of Fruits and Vegetables. 1. To develop more efficient, objective and uniform methods of determining quality and more particularly flavor of treated fruits and vegetables. 2. To determine the effect of some pesticides on the quality of selected fruits and vegetables. 3. To devise ways of counteracting effects of pesticides in reducing the quality of selected fruits and vegetables.

Cooperating stations and agencies: Conn., Me., Md., Mass., N. J., N. Y. (Cornell), N. Y. (State), Pa.

NE-22

Soil-Plant-Water Relationships as a Basis for Irrigation. 1. To study water supplies for irrigation, including the development of sources and evaluation of quality. 2. To formulate a practical system for determining when and how much to irrigate, employing consumptive use, weather records and soil moisture measurements. 3. To determine the equipment requirements and performance based on crop needs and soil properties; and supplemental uses of irrigation equipment. 4. To measure crop response to irrigation in terms of yield and quality as influenced by the interaction of irrigation with other cultural practices.

Cooperating stations and agencies: Conn., Me., Md., Mass., N. H., N. J., N.Y.(Cornell), Pa., R. I., Vt., W. Va., USDA

NE-32

Breeding Sweet Corn Hybrids Adapted for the Northeast. 1. To evaluate presently available sweet corn hybrids and inbreds for use under Northeastern conditions for both fresh market and processing. 2. To produce and evaluate regionally new promising hybrid combinations for both uses.

Cooperating stations and agencies Me., Md., N. J., USDA

SM-8

Evaluation of Alternative Vegetable Marketing Organizations and Handling Methods. 1. To determine how well the existing marketing organizations function for selected producing areas with regard to providing adequate outlets, facilities and services, and to indicate needed improvements. 2. To determine the feasible methods of maintaining quality during the marketing process and their relative economic advantages.

Cooperating stations and agencies: Ala., Fla., Ga., La., Miss., N.C., P. R., S. C., Tenn., Tex., USDA

SM-13

Retailing and Family Buying Practices as Related to the Marketing of Food. 1. to determine, in the purchase of selected foods: a. The family buying practices used; b. The influence of family characteristics, occupation, income, and related factors; and, c. The influence of store offerings and retail marketing services. 2. To determine the kinds and sources of information used by food buyers and how it relates to the purchase and use of selected foods.

Cooperating stations and agencies: Ala., Ark., Ga., Ky., La., Miss., S. C., Tenn., Va.

S-9

The Introduction, Multiplication and Evaluation of New Plants for Industrial and Agricultural Use and the Preservation of Valuable Germplasm. 1. To cooperate in a coordinated program of foreign and domestic plant exploration and introduction. 2. To multiply, evaluate and maintain introduced materials adapted to the southern region through the operation of a primary regional plant introduction station with adequate personnel and facilities for such work and through contracts between the primary station and State Experiment stations when advisable. 3. To catalogue and distribute introduced plant materials of possible value within the region and to maintain records of their use in the region. 4. To maintain and preserve germplasm of field and horticultural crops of economic value. 5. To coordinate the programs of introduction, multiplication, evaluation, and preservation in the southern region with similar programs in the other regions.

Cooperating stations and agencies: Ark., Fla., Ga., Ky., La., N. C., Okla., P. R., S. C., Tenn., Tex., USDA

S-22

Pesticide Residues - Determinations; Sampling; Effects on Plants and Soils. 1. Standardization and application of chemical and/or biological methods of pesticide residue analysis. 2. Standardization and application of field sampling procedures used in pesticide residue analysis. 3. Evaluation of the effects of pesticide residues on plant growth, plant products and soil.

Cooperating stations and agencies: Ark., Fla., La., N. C., P. R., S. C., Tex., Va., USDA

S-24

Development and Utilization of Water Resources for Supplemental Irrigation. 1. To develop and evaluate methods for utilizing potential sources of water for supplemental irrigation. 2. To determine the effects of watershed characteristics and management on water supply for irrigation. 3. To evaluate crop response as affected by: (a) variable moisture and fertilizing levels; (b) minimum moisture level in the soil and (c) varying moisture levels at different stages of plant growth. 4. To develop methods of predicting irrigation requirements of crops on different soils.

Cooperating stations and agencies: Ga., Miss., P. R., S. C., Tenn., Tex., Va., USDA

WM-15

Marketing Western Head Lettuce With Special Reference to Packaging and Cooling Methods and to the Possibilities of Market Control Programs. 1. To determine the costs, margins, and efficiencies involved in harvesting, packing, and shipping Western lettuce, and the effects of type of container and method of cooling on comparative efficiency and costs. 2. To analyze interarea and interseasonal competition in lettuce marketing and to describe the major price-determining factors in order to estimate the probable results of voluntary and compulsory marketing agreements and prorates.

Cooperating stations: Ariz., Calif.

WM-17

Competitive Position of the Western Region in Marketing Frozen Fruits and Vegetables. A. To study the trends in the production of fruits and vegetables and in the relative quantities consumed in fresh, frozen, and canned form. B. To determine factors influencing cost and efficiency in the processing, distribution, and retailing of frozen fruits and vegetables. C. To relate these factors to the competitive position of the major producing States and regions and to past trends and present organization of the industry. D. To project an efficient pattern for the future development of the industry.

Cooperating stations and agencies: Calif., T. H., Oreg., USDA

W-6

The Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants for Industrial and Other Purposes and for the Preservation of Valuable Germ Plasm of Economic Plants. 1. To cooperate in a coordinated program of plant explorations, both foreign and domestic, to obtain plant materials and to determine their potential value for industrial and other purposes. 2. To establish and maintain a Regional Plant Introduction Station with adequate facilities and personnel to handle introduced and domestic seed and plant materials adapted to the ecological conditions of the Western Region and to establish secondary stations if desired. 3. To initiate a program of cataloging, preserving, multiplying, distributing and reporting performance of introduced and domestic seed and plant materials of potential value within the region. 4. To maintain and preserve the germ plasm of field and horticultural plants of economic value to the States in the region. 5. To establish suitable methods for coordinating the program in the Western Region with programs in other regions to avoid unnecessary duplication.

Cooperating stations and agencies: Ariz., Idaho, N. Mex., Oreg., Wash., USDA

W-12

Control of Root Rots and Viruses of Dry and Snap Beans by Breeding and Other Methods. 1. To develop new or improved varieties of dry and snap beans resistant to virus diseases, and root rots. 2. To determine causes and control of root rots of beans specifically as related to: (a) causal organisms, (b) sources of resistance, (c) cultural, biological, and chemical treatments. 3. To determine the mode of inheritance of the factors for resistance to bean mosaics and curly top. 4. To determine the insect vectors, insect hosts, and virus reservoirs of the bean viruses. 5. To determine the chemical, biological, and physical properties of the curly top and bean mosaic viruses.

Cooperating stations and agencies: Colo., Idaho, Oreg., Wash., Wyo., USDA

W-38

Nature of the Influence of Crop Residues on Fungus-Induced Root Diseases. 1. To evaluate the chemical, physical and biological effects of certain crop residues on the development or suppression of root diseases. 2. To devise efficient methods and techniques for the study of this type of disease. 3. To establish a scientific basis for development of practical control measures.

Cooperating stations and agencies: Calif., Colo., Idaho, Mont., Oreg., Wyo., USDA

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FEDERAL-GRANT RESEARCH
STATE AGRICULTURAL EXPERIMENT STATIONS

JULY 1955

WEED CONTROL

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Compiled in the
State Experiment Stations Division
Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

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CURRENT SERIAL RECORDS

FOREWORD

This compilation is one of a series providing information on agricultural research at the State agricultural experiment stations which is supported by Federal-grant funds. It should be recognized that only a portion of the total States' programs is included since a substantial part of the research program of these stations is wholly supported by other than Federal-grant funds. Information on the State-fund-supported research activities must be obtained from the State where the work is being conducted. The United States Department of Agriculture also conducts a program of agricultural research from appropriations to the Department, some of which is on a cooperative basis with various State agricultural experiment stations. This is not covered herein and is not to be confused with the Federal-grant program.

The information given includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department conducting the research, the station number of the project, the number of the regional project (if several States are working cooperatively), and the Service of the United States Department of Agriculture or any other governmental agency when such agencies are cooperating in the study. Because of diverse interest and in order to provide appropriate reference certain projects are listed more than once.

The relevant regional projects appear at the end of each major subject group. The States are grouped into four major regions. These regions are designated NC - North Central, NE - Northeastern, S - Southern, and W - Western. The capital letter M following the letters for the region indicates regional marketing projects.

Inquiries regarding specific projects may be addressed to the Director of the station where the work is being conducted.

General

- Ala. Relationship of the Microflora to Deterioration of Stored Seed. To learn (1) effects of seed moisture content, storage temperature & aeration on growth of various species comprising microflora of stored seed, (2) relationship between activity of microflora & deteriorative changes in stored seed, & (3) effect of microfloral inhibitors on microbial growth & bioprocesses of seed.
Bot., Pl. Path. 571
- Ariz. Pollen Substitute for Honeybees. To produce an economical substitute for pollen fraction of diet of honeybees.
Pl. Phys. 382.
- Calif. The Marketing of Deciduous Tree Fruits & Berries in Both Fresh & Processed Outlets as Influenced by So-Called Transit or Market Disorders, with Special Emphasis on the Physiological Effects of Control Treatments. To learn (1) effect of recommended control measures for pathogenic organisms on physiology of said fruits, (2) cause of post-harvest physiological disorders, (3) relationship of factors favoring development of disorders, (4) ways of preventing or reducing disorders, (5) ways to cause growers, shippers & processors to institute ways of eliminating disorders.
Agr. Econ., Pl. Path., Pom. 1656.
- Ill. A Study of Various Factors Affecting the Thermal Resistance of Bacterial Endospores. To evaluate & determine conditions which affect the thermal resistance of bacterial endospores with particular emphasis on endospores produced by bacteria of importance in spoilage of thermally produced foods.
Food Tech. 176.
- Ind. The Effect of Fungus Products on Plants. (1) Search among products of micro-organisms for compounds affecting dormancy, growth & disease development in plants. (2) Learn mode of action & properties of compounds possessing such characteristics. (3) Develop techniques for application of useful compounds discovered.
Bot., Pl. Path. 804.
- Iowa Factors Influencing Seed Production in Certain Grasses & Legumes. Studies made with potted plants of different grasses under different temperature & photoperiod conditions to determine the time & condition of induction of floral organs. Carbohydrate-nitrogen relationships in the storage organs altered by fertilization & clipping. Chemical analyses made of roots & rhizomes. Field studies made to determine influence of time & rate of fertilization, clipping treatments, method of planting & other cultural practices upon seed yields of different species.
Agron., Bot., Ent. 1001.

Neb.

Physiologic Studies of Obligate Parasitism, with Special Emphasis on Diseases Caused by Rust. (1) Develop quantitative techniques for: inoculation of obligate parasites, maintenance of host & parasite under controlled conditions, determination of extent of development of parasite. (2) Study specific metabolic systems responsible for obligate nature of parasitism. (3) Determine metabolic changes in host during, & as result of, infection, particularly changes which may be associated with resistance or susceptibility of host. (4) From 2 & 3, effect an inquiry of possibility of effective chemotherapeutic control of obligate parasites of economic importance. (5) Establish quantitative, rapid & reliable methods for evaluating chemical compounds as possible chemotherapeutants.

Pl. Path., Pl. Physiol., Field Crops 502.

N. J.

Cultural & Handling Investigations with Asparagus. To obtain data (basic & applied) on various factors affecting asparagus production; & factors affecting quality of fresh & processed asparagus.

Hort., Veg. Crops 348.

Tex.

Spraying Equipment for the Control of Cotton Insects & for Defoliation. To (1) improve spraying equipment in efforts to obtain better distribution of chemicals for control of pink bollworm; (2) determine nozzle type, arrangement & spacing to give optimum spray patterns for insect control including pink bollworm & for defoliation of cotton plants; & (3) check insect infestations to determine effectiveness of insecticidal applications with various types and arrangements of nozzles on booms & effects of chemical removal of foliage of cotton on full populations of insects, especially overwintering of pink bollworms in unharvested material.

Agr. Engin., Ent. 722.

Ecology

N. C.

Ecological Relationships of Permanent Pasture Plants. To (1) determine relative values & adaptations of promising grasses & legumes when grown in associations; (2) determine associative effects of various mixtures on the botanical & chemical composition of the individual species; (3) determine effects of various management systems on the survival, productivity & chemical composition of certain adapted pasture legumes & grasses; (4) study root interrelationships of certain adapted pasture legumes & grasses; (5) study moisture requirements of certain adapted pasture legumes & grasses; & (6) determine best method of establishment of permanent pasture mixtures including proper seeding rates, methods & inoculation procedures.

Agron. 49.

Absorption & Accumulation

Calif. The Physiological Nature of the Processes of Salt Absorption by Roots: Relations Between Salt Absorption, Accumulation & Translocation, & the Metabolism of the Plant, Effects of Concentration & Interrelations of Salts in Nutrient Solution; Effects of Oxygen Supply to Roots & of Temperature of Culture Medium. To study the factors affecting root metabolism in relation to solute absorption, & translocation, as a basis for an understanding of crop adaptations to soil & climate, & of the use of soil amendments.

Pl. Nutr. 490.

Calif. Factors Affecting the Absorption of Minor Elements by the Leaves of Vegetable Plants. To (1) overcome some minor element deficiencies which cause a loss in crop production & a lowering of nutritional value of vegetables produced; & (2) find how to overcome the acidity or alkalinity of spray material & form of minor nutrient used in cases where these affect whether or not the nutrient can pass thru the cuticle & thru cells of the leaf into the conducting tissues.

Veg. Crops 1591.

Mich. The Absorption & Utilization of Radionuclides Applied to the Leaves of Plants. To (1) compare foliar absorption of radionuclides with their absorption thru roots, studying absorption efficiency, rates, & respective modes of use of K, Ca, P, Sr, & when practical, of N sources labeled with C¹⁴; (2) determine amounts of materials to leaves which are lost to soil thru the roots, & conversely, amounts of materials absorbed thru roots & lost by leaching from leaves; & (3) relative effects of temperature on foliar & root absorption of radionuclides.

Hort. 88.

Transpiration & Water Relations

Calif. Relation of Soil Moisture Conditions to the Physiology of Plants. To (1) develop means of relating measurable soil moisture stress conditions within root zone to effective moisture stress in the plant; (2) study effects of moisture stress on root functioning & rate of elongation; (3) determine relative effects of increasing moisture stress on various aspects of plant functioning & growth; & (4) investigate influence of environmental conditions on relations between soil moisture stress & plant growth.

Agron., Bot., Irrig. 1582. W-29.

Idaho The Water Requirements of the Apple Tree. To (1) develop a practical technique for determining the point of critical water deficit in fruit tree tissues; & (2) measure effects of acute water deficits on growth of trees & fruit.

Hort. 29.

Maine Efficient Utilization of Irrigation Water. Learn total water needs as well as critical moisture period during growing period of crops. Make soil moisture analysis on soils of different texture which can be used in designing & utilizing irrigation installations.

Agron., Agr. Engin., Soils 59. NE-22.

Mass. Effect of Moisture Availability on Growth & Development of White Pine Seedlings. Evaluate degree of availability of water to woody species over soil moisture range from field capacity to wilting percentage. Learn extent that metabolism & growth of seedlings are affected by decreasing soil moisture content in range from field capacity to wilting percentage.

Bot., For. 1035 sup.

Mont. The Determination of Forage Crop Species & Varietal Response to Varying Soil Moisture Stress During Germination. To determine (1) maximum soil moisture tension at which various grass & legume seeds will germinate; (2) effect of varying periods of time of exposure to high & low moisture tensions on germination of various grasses & legumes; & (3) relation of factors 1 & 2 above to field emergence.

Agron. 143. MS 930. W-23.

Photosynthesis

P. R. Photosynthetic Efficiency of Tropical Plants Under Various Environmental Conditions. To obtain specific information on amount of nutrients assimilated & feed manufactured by plants under varying climatic conditions.

Pl. Physiol. 100.

- Calif. Micro-Elements in Relation to Crop Growth. I. Absorption of Micro-Elements by Plants & Physiological Functions. To study (1) absorption of zinc, copper & other micro-elements by different species of plants under controlled water culture conditions; (2) effects of zinc deficiency on cytology of cell; (3) effects of manganese, copper & other micro-elements on utilization of ammonia & nitrate nitrogen & on the respiration of plants, grown under controlled water culture conditions; (4) interrelations between certain phytochromones & micro-elements; (5) relation of quality & intensity of light to function of certain micro-elements; & (6) new micro-elements essential to plant growth.
Pl. Nutr. 1024.
- Fla. Nutrition & Physiology of the Peanut. To determine the growth requirements & study the physiology of peanuts as a basis for increasing yield & quality.
Agron. 488.
- Idaho Nutrition of Fruit Trees in Idaho. Learn nutritional needs & work out effective & efficient means of supplying major & minor nutrients. Develop improved techniques for diagnosing nutritional deficiencies.
Pl. Physiol., Hort. 35.
- Ind. A Study of Root Absorption of Fertilizers by Plants. To learn relationships that exist between nutrient uptake from localized applications of fertilizers & the plant's environment.
Agron., Hort. 797.
- Md. The Role of Trace Elements in Plant Nutrition. To (1) pursue the lead & further test the theory that the role of boron in plants is one of facilitating the translocation of sugar from the leaves to the young leaves & to the stem & root tips; (2) determine if there is an additional role of boron in plants such as regulation of rate of water entry & percent moisture in plant tissues &, if so, the mechanism of action; (3) determine the role or roles of boron in germination & further growth of pollen grains; (4) determine relationship of boron to the redistribution of carbohydrates from regions of storage to other cells & tissues within stored fruits & vegetables, which should indicate if various types of internal spotting & breakdown, under boron deficiency, are caused by an inadequacy of sugar movement in absence of sufficient boron; (5) study flow of sugars from leaves to various portions of intact plants subjected to a series of boron concentrations; (6) study any & all factors that might affect water-soluble & total boron concentrations within plants; & (7) determine relationship between movement of sugar & movement of certain other substances, such as hormones, within plants.
Bot. K-8-c.

- Md. Mineral Nutrition of the Strawberry, with Particular Reference to Effects of Calcium, Potassium & Magnesium of Growth & Fruiting. To determine effect of varying levels of Ca, K, & Mg nutrition on plant growth & fruit development of the strawberry.
Hort. L-79-a.
- Md. Mineral Nutrition of the Sweet Potato with Special Reference to Cation Inter-Relationships. To determine (1) seasonal mineral nutrient uptake by sweet potato plant, & correlation of mineral uptake with enlargement of fleshy roots; (2) levels of mineral concentration in plant during growing season, associated with high crop yields; (3) effects of varying levels of cation nutrition & their interaction upon growth & yield of the sweet potato plant; (4) in field trials, the most effective methods, including timing & rate of application of mineral nutrients, to obtain optimum nutrient levels & yield response; & (5) response of sweet potato plant to minor element nutrition.
Hort. Q-79-f.
- Mass. Boron as Related to Soil Fertility & Crop Production. To (1) study plant & soil factors influencing B needs of different plants, (2) evaluate the use of plant factors & soil tests in learning fertilizer B practices for different plants.
Chem., Agron. 315.
- Mich. Development & Standardization of Methods of Determining Nutritional Requirements of Fruit Crops. To establish reliability of plant analysis as a method of determining nutritional requirements of fruit crops.
Agr. Chem., Hort. 54.
- Mo. Energetics of Cationic Relationships in Soils & Plants. To (1) learn desirable & undesirable balances between major nutrient cations of soil in terms of energy relationships between the cations, (2) learn energy levels at which NH_4 & Na in soil interfere with the K, Ca, & Mg nutrition of the plant, (3) learn extent that energy level of H affects energy levels of Fe & Mn in soil, (4) learn energy relationship between Fe & Ca, & Mn & Ca as they affect the cationic nutrition of plant, (5) evaluate relative amounts of cations needed in different kinds of soils to establish desirable energy relationships, & (6) learn extent to which nutritional balances of soil as expressed by energy relationships are transmitted to the growing plant.
Soils 263.

- N. H. Nutritional Studies with Horticultural Plants. To (1) determine causes & prevention of leaf scorch; (2) study effect of animal manures on leaf scorch & nutrition, & of (3) organic compounds of mineral nutrients as compared with inorganic forms on leaf scorch & plant response in general; (4) determine factors causing mineral deficiencies; & (5) effect of mulches on mineral nutrition.
Agr. & Biochem., Bot. Hort. 36.
- N. J. The Nutrition of Greenhouse Crops. To study relative importance of the different forms of nutrients in greenhouse soils: those present in free, soluble forms, & those present in exchangeable forms.
Hort. 336.
- N. Y. The Influence of Sprays of Nutrients & Other Materials on the Behavior of Fruit Trees. Plans for 1952 include studies of the longtime effects of urea sprays on the behavior of McIntosh apple orchards.
Pom., Agr. Econ., Agron., Pl. Physiol. 3-4.
- N. Y. Mineral Nutrition of Fruit Plants at Various Stages in their Development. To determine (1) effect of major mineral supplements on growth, fruiting habits, & fruit quality when applied or withheld at different stages of development of the fruit plant, & (2) significance of interaction between certain nutrients (N:K, K:Mg) with respect to fruiting habits & fruit quality.
Pom. 3.
- N. C. The Influence of Plant Nutrients upon the Development of the Peanut Plant & upon the Quality & Quantity of Fruit Produced. To (1) characterize deficiency conditions in peanuts for all mineral elements considered to be essential for plant growth; (2) evaluate effect of different plant nutrients upon production of flowers & development of fruit; (3) characterize changes in chemical composition of different parts of plant thruout growing period; & (4) study physiological interrelationship between boron & calcium in peanuts.
Agron., Bot., Stat. 70.
- N. C. Nutritional & Physiological Studies of Corn. To study (1) physical distribution of actively absorbing roots of corn plant under various environmental conditions; (2) efficiency of phosphate fertilizers for corn production as influenced by placement; (3) growth habits of corn under varying water stresses; & (4) interrelationship between nutrient & water supply as affecting corn growth.
Agron. 85. Coop. BPISAE.

Ohio

Factors Affecting Growth & Mineral Absorption by Plants.
2. The Influence of Hydrogen Ion Concentration in the Absorption of Minerals by Field Crop Plants. To interpret the effects of hydrogen ion concentration on plant growth when other factors of the nutrient media are held constant.
Agron. 36-2.

Okla.

A Study of Chlorosis of Certain Woody Ornamentals in Oklahoma. To find the most satisfactory combination of chemicals & concentrations, & methods of application to correct the conditions causing chlorotic foliage of Pin Oaks, Thunberg spireas, & other affected plants under Oklahoma climatic & soil conditions.
Hort. 866.

Tex.

The Influence of Mineral Nutrition, Irrigation & Variety on the Nutrient Uptake & Metabolism of Cool & Warm Season Vegetable Crops. Learn (1) effect of various levels of macro & micro nutrients on metabolism of plants with emphasis on uptake & utilization of S & mg, (2) interaction between irrigation & mineral nutrition on cool & warm season crops, (3) differential variety response to macro & micro elements with & without supplemental irrigation.
Agron., Hort. 1044.

Utah

Insect Activity in Relation to Fluoride Content of Plants.
(1) Survey areas of fluoride injury to plants for purpose of: learning role of insects in injury of plants, studying insect populations & species on plants injured by fluorine. (2) By greenhouse experiments learn if fluoride level of plant has any direct effect on activity of insects associated with plant under study.
Ent., Bot., Pl. Path. 462.

W. Va.

Nutrition of Apple Trees in West Virginia. In a urea study determine (1) most efficient & economical use of N applied as a spray; (2) if N reserves in apple trees can be maintained by N sprays alone; & (3) effect of N sprays on biennial bearing, fruit size, fruit color, storage life, & fruit set. In study of nutrient status of apple orchards, (1) evaluate nutrient status of commercial orchards as determined by leaf analyses for N, P, K, Ca & Mg; & (2) determine where in the State nutrient deficiencies might be appearing & to what extent such a situation may exist.
Hort., Ent., Pl. Physiol. 56.

Wis.

Relationship of Plant Nutrition to Disease Incidence & Expression of Symptoms. To learn influence of various (1) plant nutrient ratios & levels on visual expression of certain potato virus & other diseases, (2) nutrient ratios & levels on plant susceptibility to diseases & their effect on yields, (3) nutrient ratios & levels on behavior of virus in plant, measured quantitatively, (4) potato virus diseases on nutrient uptake by plant.
Field Crops, Pl. Path., Pl. Physiol. 774.

Metabolism

- Del. Study of the Enzymology & Chemistry of Pectic Substances & Related Cell Wall Constituents of Plants. To (1) determine physical & chemical attributes of several enzymes which alter pectic substances & related compounds; (2) assay cell walls of various plant tissues using well characterized or pure enzymes; & (3) determine, if possible, physiological role of such enzymes & their substrates.
Agr. Chem. 133.
- Ill. The Occurrence & Activity of Glycolytic Enzymes in Corn. To (1) determine if glycolytic enzyme system can be detected in corn seeds & seedlings using methods which have been shown adequate with other plants; (2) determine presence & degree of activity of glycolytic enzyme system in various inbred lines & hybrids of corn; & (3) isolate & characterize specific enzymes such as aldolase & triose phosphate dehydrogenase which play key roles in this metabolic system.
Agron. 162.
- Ill. Relation of Light, Nutrients & Carbon Dioxide to the Metabolism of Corn Plant & to its Yield of Stover & Grain. To learn (1) relation of light to composition & yield of stover & grain per plant of corn at different rates of planting, (2) relation of CO₂ content of air to composition & to yield of stover & grain per plant of corn at different rates of planting, (3) metabolism of corn plant & its response to different light, CO₂, & nutrient conditions.
Agron., Pl. Physiol. 15-377.
- Ind. A Study of the Chemical Forms & Functions of Manganese in Selected Plants & Animals. To determine (1) effects of different levels of manganese nutrition on growth, reproductive ability, enzyme activity, & N metabolism of plants; (2) effects of different levels of Mn nutrition on growth, reproductive ability, vitamin requirements & enzyme activity of white rats; & (3) similarities & differences in metabolic functions of Mn in different types of tissue, by chemical study of Mn in tissue from plants & animals.
Agr. Chem., An. Husb. 647.
- Iowa Mechanism of Action of Vitamin B₆ -- Containing Enzymes. To (1) highly purify one or more enzymes which need vitamin B₆ in coenzyme form for activity; (2) ascertain if enzyme contains a metal; (3) study properties of purified enzyme including ultraviolet spectrum during catalysis & effects of inhibitors; (4) interpret ultraviolet spectra of vitamin B₆ & related compounds, & use spectrophotometric methods to study interaction of amino acids, vitamin B₆ & metal ions in model systems as well as in enzymatic system; & (5) draw from above work & other studies definite conclusions as to mechanism of action of B₆ in enzymatic catalysis.
Chem. 1259.

Ky.

A Study of Biochemical Mechanisms in the Genus Nicotiana.

Learn more about fundamental biochemical processes of tobacco plants — how they are affected by genetics & physiology of plants — & to apply that knowledge to improvement of smoking quality of Burley tobacco.

Pl. Physiol. 87.

Mass.

Studies in Metabolism of Coniferous Tree Seed During Germination. Learn more about respiratory ratios, dry weight decrease & rates of carbon dioxide evolved during germination of forest tree seed.

Bot., For. 1034 Sup.

N. Y.

Intracellular Respiratory Systems in Plant Tissues. To (1) obtain information on properties of individual respiratory enzymes in plant tissues; (2) investigate manner in which individual enzymes are linked together into organized respiratory systems; & (3) investigate mechanisms whereby complete respiratory system of plant tissues is capable of producing energy required for physiological activities which are exhibited by intact plant.

Bot. 55.

N. Y.

The Nitrogen Compounds of Plants & Their Metabolism. To (1) recognize, isolate & identify new soluble N compounds that occur as constituents of plants & determine their mode of origin & their function; (2) characterize protein fraction of plants by hydrolysis & quantitative estimation of amino acids so produced; & (3) investigate effects of nutritional & environmental factors on soluble & insoluble N fractions.

Bot. 56.

N. C.

A Study of the Cytochrome System of Higher Plants in Relation to Iron Requirements & Factors Affecting Iron Metabolism. To (1) determine if cytochrome c reductase of plants contains iron as an integral portion of enzyme, & study certain nutritional & other factors that may affect activity of this enzyme system; & (2) purify cytochrome oxidase enzyme of higher plants & determine nutritional & other factors that may affect activity of this enzyme.

Bot. 40. Coop. USDA.

N. C.

Factors Influencing the Biosynthesis of Carotenoids by Yeasts. (1) Identify & characterize carotenoid pigments produced by species of yeast in genera Rhodotorula, Torulopsis, Cryptococcus & related genera. (2) Learn influence of cultural conditions on carotenoids production by yeasts in these genera.

Chem., Bot., Pl. Physiol. 64. Coop. ARS.

- Oreg. Respiration & Intermediary Metabolism in Economic Plants. To (1) determine respiratory mechanisms, energy-yielding reactions, & oxidase systems operative in economically important plants; & (2) develop methods for investigating practical problems which involve effects of abnormal or adverse conditions upon metabolic reactions of plants.
Agr. Chem. 149.
- Pa. Determination of Oxidative Enzyme Systems & Oxidative Pathways in Higher Plants. To (1) develop & improve techniques for detecting presence & measuring the activity of oxidative enzymes; (2) determine presence & activity of oxidative enzymes in higher plants; & (3) relate presence of oxidative enzymes to metabolic pathways in higher plants.
Agr. & Biochem. 1218.
- Pa. The Initiation of Synthesis, Biological Stability & Mechanism of Formation of Adaptive Enzymes in Micro-Organisms. To (1) study mechanism of induction of enzyme syntheses, (2) investigate in vivo stability of adaptive enzymes of cells under stresses & of availability of constituent amino acids for other syntheses, (3) study specific effects of environment on formation of adaptive enzymes.
Pl. Physiol. 1253.
- Pa. Biochemical Effects of Phosphorus & Nitrogen Deficiency in Algae & Higher Plants. To learn (1) metabolic reactions most sensitive to P & N deficiencies, (2) phosphorylation mechanisms (source of ATP) in P-deficient plants & their dependencies upon nutrient P, (3) phosphorylation of heptoses & pentoses in plants, (4) primary effects of N deficiency upon free amino acid & protein bound amino acid concentration.
Pl. Physiol. 1254.
- Pa. Oxidative Metabolism of Bacteria. (1) Learn metabolic reactions by which bacteria oxidize carbohydrate to completion. (2) Relate oxidative metabolism of bacteria to reactions by which energy is trapped & synthetic C skeletons are formed. (3) Learn relationship between oxidative metabolism & photometabolism in photosynthetic bacteria.
Bact., Pl. Physiol. 1265.
- Utah The Effects of Fluorides on Certain Enzymes Present in Selected Plant & Animal Tissues. To (1) investigate general physiological basis of fluorine toxicity in plants, including effects on water relations of leaves, toxicity symptoms, respiration & photosynthesis, (2) learn effects of different levels of soluble fluorides on esterases, phosphorylases, transphosphorylases, phospho-isomerases, dehydrogenases, & enzymes involved in metabolism of carbohydrates in selected plant tissues of known genetic origin, (3) learn effects of different levels of soluble fluorides on esterases, phosphorylases, transphosphorylases, phospho-isomerases, dehydrogenases & enzymes involved in metabolism of carbohydrates in selected animal products, blood, bone marrow, liver, kidney, heart, & other muscles of various farm animals fed under known conditions, (4) correlate possible changes in enzyme

systems with histo-chemical changes which occur in plants & animals exposed to different levels of soluble fluorides.

Bot., Pl. Physiol., An. Husb., Dairy Husb., Vet. 457.

Wash. Metabolism of Germinating Peas. To study nature of reactions which take place during germination of pea seeds, mechanisms by which reactions are controlled, & resulting changes in constituents of plant.

Agr. Chem. 769.

Growth & Growth Regulators

Calif. Factors Affecting the Abscission Process in Relation to Defoliation in Cotton. To learn of the physiological factors affecting abscission & to develop more reliable & efficient methods of defoliating cotton.

Bot., Agron., Soils, Agr. Engin. 1581. Coop. USDA.

Calif. Plant Growth Regulators in Relation to the Physiology of Citrus. To (1) determine the manner in which mature fruit drop, increased fruit size & increased storage life of citrus may be regulated by the use of plant hormones, investigating effects of plant growth regulators on photosynthesis, respiration, transpiration, translocation, cell elongation, etc.; (2) evaluate new or partially field-tested materials for their effects on functioning of plants, using lab & greenhouse techniques; & (3) investigate possibility of extending use of plant growth regulators to control of other plant processes, using information developed under (1).

Pl. Biochem. 1346.

Colo. Chemical & Biological Investigations of Plant Growth Regulators. To investigate (1) normal & abnormal metabolites as influenced by natural & synthetic plant growth regulators; (2) effects of environment on reactions of organisms to natural & synthetic plant growth regulators; (3) biological & chemical mechanisms of action of natural & synthetic regulators; (4) effects of the regulators on quality & nutritional character of crop plants; & (5) to synthesize or isolate plant growth regulators that may be needed in carrying out the above.

Bot. 80. Coop. USDA.

Conn. Biochemical Processes Underlying Growth Regulation in Eastern Hemlock (*Tsuga canadensis*). To explore biochemical processes explaining effects of light & temperature on annual growth cycle of eastern hemlock; breaking of seed of bud dormancy, terminal & lateral stem elongation, & return to dormancy.

For., Gen., Bot., Pl. Physiol. 420.

- Del. Control of Growth & Fruiting of Strawberry by Spray Application of Growth-Regulating Chemicals. To (1) determine effectiveness of chemical plant thinning & plant spacing on vigor & yield of strawberry; (2) test efficacy of certain chemicals in regulating runner growth of certain strawberry varieties; & (3) test efficacy of certain chemicals in promoting fruit set and/or maintenance of berry size.
Hort. 268.
- Fla. Effect of Growth Regulators in Production & Quality of Certain Nut & Fruit Plants. To determine effects of growth regulators on (1) thinning of excessive nut set in pecans to improve quality & reduce biennial bearing; (2) reduction of winter chilling requirements for breaking dormancy of several fruits; & (3) delay of flowering to reduce spring frost hazards at blossoming time of fruits.
Hort. 599.
- Ill. The Relation of Hormones, Ascorbic Acid, Ascorbic Acid Oxidase, & Other Compounds in the Development of Functional Ear Shoots of Corn. To (1) determine cytological & biochemical processes involved in the development of ear shoots of corn; (2) determine effects of pollination of subsequent biochemical & cytological changes of ear shoots of corn; & (3) investigate nature of growth regulating substances involved in ear & kernel development in corn.
Agron. 154.
- Ind. The Physiology of Flowering & Fruiting of Selected Plants. To (1) determine nature of physiological processes responsible for flower initiation; (2) determine nature of physiological processes responsible for fruit development; & (3) apply these findings to horticultural crops.
Hort. 662.
- La. Separation & Characterization of Growth Promoting Substances in Plant Extracts. Isolate & identify microorganisms requiring for maximum growth addition of certain plant extracts to a medium containing all known B-vitamins. Study chemical, physical & biological properties of substances. Develop methods of isolation & purification. Identify or characterize isolated factor(s).
Pl. Physiol. 865.
- La. Development of Techniques & Evaluation of Chemicals for the Defoliation and/or Second-growth Inhibition of Cotton. (1) Screen & evaluate new chemicals as defoliants & second-growth inhibitors, (2) study process of abscission & second-growth inhibition, (3) develop ground spray machines for field application of defoliants and/or second-growth inhibitors, (4) evaluate different nozzles & nozzle arrangements, (5) determine proper spray volume & rate of chemical, & (6) evaluate concept of bottom defoliation as an aid to reducing boll rot.
Pl. Path., Agr. Engin.

- Md. Chemical Thinning of Apples & Peaches. To (1) determine response of heavy-fruited major varieties of apples to post-bloom chemical thinning sprays & margins of safety for each variety; (2) study effects of time of application & concentration of chemicals on thinning of apples & peaches by means of post-bloom sprays; (3) develop satisfactory method of chemical thinning of peaches in post-bloom period; & (4) determine possibilities of reducing biennial bearing of major apple varieties by chemical thinning.
Hort. L-74-B.
- Md. Influence of Nutrient Intensity & Balance on Growth, Yield & Quality of Cauliflower. To learn (1) mineral nutrient levels in substrate & in plant for optimum growth & head production of cauliflower, (2) influence of nutrient levels in substrate & in plant on buttoning, (3) effects of various methods & times of application of different fertilizers as related to nutrient content of plant & to plant growth & head production.
Hort., Pl. Physiol. Q-79-H.
- Mich. Agricultural Application of Growth Regulators & Their Physiological Basis. To (1) develop physiological studies to enhance understanding of mechanism of action of plant growth regulators; (2) find new materials & methods to apply to crop production practices; & (3) find new uses for materials already available.
Hort., Agr. Chem. 55.
- Mich. Control of Flowering & Fruiting in Vegetable Crops. Define environmental conditions which control flower formation & development. Evaluate reproductive & vegetative responses to chemical treatment. Promote earlier flowering & fruiting thru chemical treatment & controlled environment & develop practical basis for these methods in commercial production. Study biochemical & morphological aspects of flowering.
Hort., Pl. Physiol. 89.
- Minn. Physiological Studies of Fruit Crops as Related to Growth & Development. To (1) study fruit plants to learn their ability to resist low temperatures; the relationship of plant structure & physiological behavior to cold resistance; & effects of environmental or cultural factors upon survival; (2) screen new growth regulating chemicals for use in certain applicable phases of tree & small-fruit production; test new or additional uses for these materials in fruit plantings; & to undertake basic physiological studies to learn mode of physiological action of the chemicals; (3) study response of fruit plants to photoperiod under controlled length of day conditions; & (4) make survey to learn general nutrient level of fruit plants in major producing areas of the state, & make mineral analyses of plant tissues to be correlated with appropriate plant responses.
Hort. 2124.

Mo. Control of Fruit Setting & Preharvest Drop of the Apple.
a. Hormone Sprays for Fruit Thinning & Control of Preharvest Drop. To (1) compare NA-Am & IPC at various concentrations with NA for thinning Jonathan & Golden Delicious apples in two or three commercial orchards; & (2) compare 2,4,5-TP at various concentrations with NA for preharvest crop control of Wealthy, Jonathan & Winesap varieties in two or three commercial orchards.

Hort. 195-a.

N. Y. The Action of Plant Growth Hormones in Plant Metabolism.
1. Absorption, Distribution & Modification in the Plant of 2,4-Dichlorophenoxyacetic Acid, 3-Indoleacetic Acid & Other Hormone-Like Substances Labelled with Radioactive Carbon. To determine the extent of uptake, areas of accumulation & nature of any modification of certain plant growth regulators by the plant at various times after spot applications to leaves.

Food Sci. & Tech. 1-1.

P. R. The Response of Tropical Plants to the Application of Plant Growth Regulators. To determine effect of foliage sprays with maleic hydrazide & other growth regulators on suckering of tobacco, sprouting of root crops, flowering of coffee & vanilla & on other crops where hormonal regulation might be of value.

Pl. Physiol. 38.

S. C. Chemical Thinning of Peaches. To (1) determine concentration & time of application of 3-Cl-IPC on young fruit of the peach to obtain commercial thinning, & (2) test various chemicals & formulations of chemicals (growth regulators) to learn their usefulness as fruit thinning agents.

Hort. 62.

Vt. Antibiotics as Plant Growth Stimulants. To (1) test multitude of pure antibiotics for plant growth stimulation; (2) using tomato roots or Duckweed, examine effect of antibiotics on respiration of these plants to determine if a short assay method could be developed for such activity; (3) compare radioautographs of extracts from normal & stimulated plants grown on C¹⁴ labeled glucose to attempt to get a clue to the nature of the stimulating action; & (4) attempt to discover if the stimulating effect of a result of uncoupling of oxidation from phosphorylation.

Biochem. 31.

Wis. Applications of Plant Growth Substances & Their Mechanism of Action. To amplify present applications, develop new uses for plant growth substances, determine manner in which they exert their effects, & investigate their use in controlling starch production of peas & their influence on protein content of field crops.

Agron., Biochem. 755.

- Wyo. The Use of Growth Modifiers in Production of Legume Seed. To (1) screen growth-modifying chemicals for influence on legume seed production; & (2) test promising treatments on different legumes under field conditions to determine practical recommendations.
Agron. 564. W-23.

Environmental Factors

- Ariz. Factors Affecting the Production of Citrus in Arizona. To study (1) rootstock effects & nursery management, (2) adaptation of new varieties & strains, (3) soil management in relation to nutrition, (4) nutritional & growth stimulating sprays, (5) citrus irrigation, & (6) low temperature effects, surveys & grove heating.
Hort. 299. Coop. SCS.
- Ark. A Study of the Factors Influencing Cold Injury to Peach Trees. To study environmental & physiological factors that influence susceptibility to cold damage in peach trees, giving special attention to factors that influence the initiation, intensity, & duration of rest period, in attempt to find a basis for development of techniques for modification or control of rest.
Hort., For. 209.
- Calif. Physiological & Pathological Problems Associated with The Consumer Packaging of Table Grapes. To determine (1) rates & amount of SO₂ diffusing into consumer package during fumigation, (2) resistance of different types of plastic films to corrosion from SO₂ under different moisture conditions, (3) bleaching effect of SO₂ on wet printed package material, (4) size & shape of consumer packages most suitable for clusters of different table grape varieties, (5) adaptation of cluster size & shape to standard sized packages by thinning before harvest, (6) relative stem brownness & dryness of consumer packaged vs. standard shipping container packed grapes, (7) precooling rates of fruit in consumer packages vs. that in standard shipping containers, (8) relative amounts of shatter, & (9) relative amounts of decay.
Viticulture 1640.
- Fla. Physiological Responses of Florida Forage Crops to Environmental Variables. Learn interactions of temperature, light & associated radiation, water, nutrients & management on behavior of selected forage crops.
Agron., Pl. Physiol. 743. S-12.
- T. H. The Growth of Sugar Cane, *Saccharum Officinarum*, as Affected By Environmental & Other Factors. Physiological Factors Influencing Organogenesis (Development of Organs) in *Saccharum*. To determine physiological factors influencing development of vegetative & reproductive organs of certain varietal hybrids of *S. officinarum*.
Bot. 653.2.

- T. H. Studies on Post-Harvest Physiology of Hawaiian-Grown Fruits, Vegetables & Ornamentals as Applied to Quality, Storage Life & Marketability. Investigate basic requirements of harvesting, transporting, handling & storage necessary to assure high quality & marketability of various plant commodities from various areas.
Pl. Physiol., Pl. Path., Agr. Econ. 663.
- Idaho Effect of Irradiating Russet Burbank Potatoes with Radio-Active Fission Products upon their Storage & Market Qualities, Disease Prevention & Killing of Nematodes Contained Within the Tubers. To learn (1) dosage of irradiation from fission products that will inhibit sprouting of Russett Burbank tubers, (2) effect of said treatment on taste, cooking & processing qualities, flesh color & greening of skin under normal retail conditions, (3) loss during storage due to rots, shrinkage, & sprouting compared to non-treated tubers, (4) temperature that will allow least moisture, sprout & rot loss to treated tubers, (5) how long marketing can be extended by use of treatment & still receive consumer acceptance, (6) best time for using treatment to expect best results, (7) possible effect of irradiation of tubers in delaying expression of Verticillium wilt thru modification of dormancy, (8) if said dormancy can be broken by use of ethylene or other chemicals, & (9) if Ditylenchus destructor can be killed by irradiation without injuring the table quality.
Hort., Pl. Physiol. 34. Coop. AEC.
- Kans. Physiological Studies on Crop Plants. To (1) determine role of wheat awn, particularly its relation to yield, test weight, & kernel weight; (2) study physiological factors influencing development of chorosis in sorghums; & (3) develop or adapt chemical tests for tissue viability in wheat plants subjected to temperature extremes; also, comparable test for protoplasmic differences which may exist between drought resistant & susceptible lines of wheat.
Bot., Pl. Path. 189. Coop. USDA.
- Kans. The Influence of Some Factors Affecting the Biochemical & Physical Properties of Wheat. To investigate the physical & biochemical properties of wheat in the late preharvest, harvest & postharvest periods.
M. I. 216.
- Ky. Physiological Investigations of Red Clover. Obtain basic physiological information which will aid in improvement of red clover.
Agron., Pl. Physiol. 94. Coop. FCRB.

- Ia. The Effects of Different Lengths of Dormant Period & Certain Chemicals upon the Emergence, Productivity and Storing Ability of Several Varieties of Potatoes. To (1) try to determine reason for different varieties having different rest period needs & interaction between rest period requirements & productivity of each variety; & (2) ascertain effect of certain growth regulators, applied as both pre-harvest & post-harvest treatments on storage ability and quality of standard varieties of potatoes.
Hort. 393.
- Mich. The Interrelation of Environment (Temperature and Relative Humidity) and Spray Chemicals on Russetting, Luster, Color and Ripening of Apple Fruits and on Physiology of Apple Leaves. To determine (1) environmental conditions & time during flower and fruit development that fruit russetting is most likely to occur from use of chemicals; (2) if injury to epidermal cells of flower and fruit is necessary for occurrence of russetting by pesticide chemicals; (3) relation between apple varieties & injury from various chemicals as influenced by temperature & humidity; & (4) interrelation of plant regulators used to control pre-harvest fruit drop & night & day temperature on rate of fruit ripening.
Hort. 116
- Minn. Storage of Grain in Various Atmospheres in Sealed Bins. To learn effects of various atmospheres on the microbiological, entomological & biochemical factors that influence the quality of stored grains, especially wheat, corn and soybeans.
Agr. Biochem. 1517.
- Miss. Investigations on Winter Hardiness: Studies on Certain Physiological and Pathological Aspects of Freezing Injuries of Small Grains. Physiological studies: effect of some electrolytes and other diffusible substances on degree of freezing injury. Pathological studies: predisposition of small grains to action of root parasites following exposures to freezing temperatures.
Pl. Path., Pl. Physiol. FL-12.
- Nebr Factors Affecting Bud Dormancy in Plants. To determine nature of bud dormancy in plants & to develop weed control measures based on such findings. Field & greenhouse work will include: Establish the phenology of several economically important weed species relative to breaking & including bud dormancy. Measure effects of day length, day & night temperatures & moisture levels under controlled greenhouse conditions. Attempt to accumulate continuous air & soil temperatures. Measure effects of control practices on bud production, visibility & vigor. In the lab, work falls under 3 major fields: 1. biochemical analysis of plant & bud tissues to determine inherent control mechanisms such as enzyme levels, hormones, growth substances, carbohydrate levels, etc. 2. determine effects of varying nutritional levels thru use of tissue culture technique using excised buds. Compare proteins, amino acids, carbohydrates & enzymes. 3. screen and develop chemicals which may have value in inducing or breaking bud dormancy, starting with ethylene chlorohydrin, indoleacetic acid, phenoxyacetic acid & urea derivatives.
Agron. 478. NC-10. Coop. Agr.

- N. H. Effects of Light Quality on Plant Growth. To determine effects of light from various white & colored fluorescent lamps, alone & in combinations with light from incandescent lamps, on plant growth.
Bot. 39.
- N. J. Effects of Plant Environment on Vegetables in New Jersey. To learn (1) needs among different varieties of vegetable crops in chemical & physical environment for best growth, yield & quality of product, (2) yield for various crops grown on irrigated vegetable fertility plots, (3) effects of use of nitrified materials as sidedresser, & (4) more about timing of irrigation by measurement.
Pl. Physiol., Ent. 340.
- N. C. Study of Factors Influencing the Effect of Sub-Freezing Temperatures on Peach Tree Survival. To learn relationship between (1) rest period & hardiness, & (2) hardiness & growth substances in tree.
Hort. 66.
- N. Dak. Physiological Responses of Hard Red Spring Wheat to Temperature. To study physiological effects of atmospheric temperature on day-to-day development of wheat plant, especially during critical stage of tillering, jointing, pre-heading, heading and post-heading.
Agron., Cer. Tech., Bot. 5.
- N. Dak. Low Temperature Endurance in Corn. To (1) test & evaluate ability of corn inbred lines to germinate & develop in seedling state at sub-optimum temperature; (2) study association between a. ability to germinate & grow at sub-optimum temperature & ability to resist slight freezing in early seedling stages; & b. ability to germinate & grow at sub-optimum temperature & some morphological, physiological or pathological character of corn plant or kernel; (3) study effect of environment under which seed is produced upon reaction of progeny grown at low temperature; & (4) study rapidity of germination & ability to produce good stands under adverse, cold, wet soil conditions.
Agron., Pl. Physiol. 5B.
- Ohio The Response of Winter Wheat Varieties & Strains to Climatic & Edaphic Factors. To determine effects of climate, soil characteristics & soil management on yield & quality of winter wheat varieties & strains in Ohio.
Agron. 3. Coop. Cer. Crops & Diseases, (BPI) USDA.
- Pa. Light & Temperature Effects on the Growth of Greenhouse Roses. To study the effect of various night temperatures in relation to natural light conditions upon the flower production & keeping quality of greenhouse roses.
Hort. 1232-B.

P. R. Factors Affecting Seed Germination Under Tropical Conditions.
(1) Learn how germination capacity of seeds produced in Puerto Rico is influenced by changes in environmental factors during production & conservation. (2) Develop better techniques of seed production & conservation to secure maximum percentages of germination of seeds used for crop production.
Pl. Physiol., Agron. 40.

P. R. Effects of Photoperiod on Growth & Development of Tropical Plants. To find any lighting procedures that will make possible the control of growth & differentiation of plants in the tropics & to study light requirements of such plants in relation to other environmental factors.
Pl. Physiol. 68.

Tenn. The Effects of Certain Atmospheric Effluents upon the Growth & Composition of Plants & upon Animal Life, at Locales in East & Central Tennessee. To ascertain the verity of numerous contentions that the harmful effect upon growth & composition of crops & the severe effects upon livestock in certain locales are attributable to effluents released from nearby manufacturing operations; to establish the causal factors for any such determined effects; & to propose remedial measures & to demonstrate their efficacy.
Chem., An. Husb., Vet. Sci. 13.

Vt. Time of Seeding & Responses of Forage Seedlings to Climate.
To determine (1) early seedling growth of the more important forage species when seeded on different dates in the field & of the various annual weeds normally present in pasture or cultivated soils, particularly the time of emergence & rate of growth of these weeds, & (2) the effects of temperature & length of day on germination & early growth of both crops & weeds under controlled conditions.
Agron. 10. NE-21. Coop. BPISAE.

Wyo. Drought Resistance Studies with Winter Wheat Seedlings. Obtain selections of winter wheat exhibiting drought resistance in seedling stage. Learn heritability percentage of same, & potential of selected strains as possible new varieties or improved selections of the variety Cheyenne.
Agron., Pl. Physiol. 603.

Plant Chemistry

Ala. The Market Value of Peanuts as Affected by Changes in Chemical & Physical Properties During Storage. To learn (1) effects of storage on chemical, biochemical & physical changes in peanuts; (2) relationship of initial quality of peanuts to changes during storage; (3) relation of microflora to respiration & associated deteriorative changes in peanuts; & (4) relationship between chemical, biochemical & physical properties & changes in odor, flavor & certain nutritive factors affecting market value of peanuts.
Bot., Pl. Path. 570.

- Calif. The Chemical Constitution of Carbohydrates & the Mechanisms of their Formation & Breakdown. To obtain information on fundamental structure of the complex carbohydrates (chiefly of plant origin) & biochemical mechanisms thru which they are formed & broken down. Carbohydrates to be included are: sucrose, starch, inulin, galactans, pentosans, seaweed polysaccharides, such as glucosan produced by crown-gall organism, etc.
Pl. Nutr., Food Tech. 666.
- Colo. Isolation & Identification of the Polyphenols of Crop Plants & a Study of their Properties & Biochemical Functions. To (1) quantitatively estimate polyphenolic constituents of crop plants with reference to plant parts used for food; (2) separate & identify principal polyphenols of specific plant species & varieties; (3) study & consider properties of polyphenols separated & identified; & (4) establish various biochemical functions for polyphenols isolated.
Bot., Chem., Pl. Physiol. 92. Coop. USDA.
- Conn. Components of Cigar Tobacco Leaf Contributing to Market Quality. To (1) learn compounds in cigar binder & wrapper leaf that contribute to flavor, aroma, color & other properties affecting consumer demand, & (2) study manner in which these compounds arise, how quantity can be altered & how they can be removed from or added to tobacco at various stages of processing.
Pl. Path., Bot. 651.
- Conn. Plant Tissue Analysis as a Measure of Nutritional Status of Fruit Trees. To (1) note seasonal trend in soluble nutrient content of apple leaves, (2) note effect of tree position of leaves on seasonal trend, (3) amass data by state-wide leaf analysis survey to indicate general nutritional levels of apple orchards, (4) note if nutritional level of apple trees varies by tree age & variety; & (5) investigate relation of soil fertility to tissue composition.
Pon., Soils, Agron. 183.
- T. H. The Form of Nitrogen in Grasses Following Nitrogen Fertilization. To (1) determine forms & distribution of N in Panicum & Napier grasses, & (2) study relationship of N to phosphorus & potash in Napier grass.
Agron., Soils, Agr. Chem. 622.5
- Iowa Corn Endosperm Carbohydrates. To (1) identify & characterize enzymes involved in corn-sugar-polysaccharide synthesis & metabolism, (2) ascertain distribution of enzymes in different endosperm fractions, (3) explore influence of genetic constitution on enzymes which are present or their distribution or on other factors which might influence polysaccharide metabolism.
Pl. Physiol., Agron. 1283.

- Mont. Determination of Magnesium in Plant Materials by Flame Spectrophotometry. To (1) determine quantitatively effects of common anions on magnesium flame intensities; (2) determine quantitatively effects on common cations on magnesium flame intensities; & (3) incorporate results obtained into an effective, rapid procedure for routine determination of magnesium in plant materials.
Chem. Res. 57, M. S. 933.
- N. H. Determination of Calcium & Magnesium in Plant Material. To determine calcium & magnesium in the presence of interfering substances by a rapid volumetric method.
Agr. & Biol. Chem. 44.
- N. H. The Hemicellulose of Forage Crops. To determine what differences occur in the hemicellulose of forage crops (1) in different parts of the plant, & (2) as the plant matures.
Agr. & Biol. Chem. 45. Coop. U. S. Reg. Past. Res. Lab.
- N. J. A Study of the Formation of Pectic Substances. To furnish some information concerning the synthesis of pectic substances.
Pl. Physiol. 505.
- Ohio Development of X-Ray Diffraction Techniques for Plant Materials
To develop new techniques & modify existing ones of determining presence & molecular structure of mineral salts in studies of mineral nutrition of plants.
Agron. 45. Coop. BPISAE.

Plant Anatomy, Morphology, Histology & Cytology

- T. H. Pollination, Fertilization & Post-Fertilization Requirements of Passion Fruit & Other Plants of Commercial Potential in Hawaii.
To determine factors involved in pollination, fertilization & post-fertilization of passion fruit & other types of commercial potential, specifically to determine: 1. extent of self- and cross-compatibility; 2. factors responsible for self-sterilization & differences in compatibility; & 3. factors responsible for malformation of fruit.
Pl. Physiol. 662.
- Ill. Morphological Studies of Certain Agronomic Crops. To study (1) morphological development of corn, wheat, oats, soybeans, etc., & describe initiation & development of primordia of parts of plant; (2) cycle of development of above in different seasons & under different growing conditions, learn when different stages of development of plant occur & duration of each stage; (3) morphological characteristics of above in relation to corn & stem rust, strength of stalk or stem, & other agronomic characteristics; & (4) developmental morphology of certain aberrant types of corn, wheat, oats, soybeans, etc.
Agron., Pl. Physiol. 15-374.

Wis. Relation of Plant Character, Composition & Anatomy to Growth, Blossoming & Fruitfulness. To determine (1) if flowering of plants under widely different environmental conditions is due to a common physiological condition within plants or does each plant represent a specific reproductive type; & (2) nature of blossoming stimulus.
Hort. 319.

Soil-Plant Relations

Ark. Supplemental Irrigation Investigations with Horticultural Crops. To (1) study influence of varied water sources on soil condition & crop response with particular reference to sources with high salt content, & determine if such waters can be safely used under any conditions of horticultural production; (2) measure value of supplemental irrigation in terms of yield & quality of horticultural crops now generally produced in Arkansas; (3) determine if supplemental irrigation can be used in developing production of new horticultural crops in Arkansas; & (4) study possible changes that may be needed in management program of irrigated crops, such as planting dates, varieties & disease & insect control.
Hort., For. 310.

Calif. Studies on Plant-Soil-Water Relations. To determine (1) the factors affecting the outgo of water, (2) energy relations between soil, water & plants, & (3) effect on plants resulting from water deficiencies.
Irri. & Veg. Crops, Pom. 1106.

Calif. Factors Influencing the Re-Establishment of Peach Orchards on Old Peach Soils. To discover cause & devise methods for preventing the peach replant growth depression.
Pom. 1126.

Colo. The Influence of Irrigation Practices on Soil Structure & Plant Growth. To learn effect of methods of (1) application of irrigation water on moisture distribution, surface crusting, & plant emergence & growth; & (2) land preparation for irrigation & effect of subsequent tillage operations on soil tilth.
Agron., Soils, Agr. Engin. 17.

Fla. The Maintenance of Soil Fertility under Permanent Pasture. To (1) study effects of different soil types & various management practices on yields, composition of forage & animal response; & (2) effect of these practices on physical & chemical characteristics of soil & on maintenance of soil fertility.
Agron., Soils, An. Husb. 404.

Ill.

Soil Moisture as a Factor in the Growth & Yield of Corn.

To (1) obtain quantitative information on relation between different levels of soil moisture deficiency & growth & physiologic behavior of corn at different growth stages; (2) determine efficiency of water use by corn at different levels of soil moisture deficiency under fertility conditions & plant populations conducive to high yields; & (3) relate water use by corn to open-pan evaporation & other climatic characteristics.

Agron. 250.

Iowa

Soil & Climate Factors Affecting the Efficient Use of Water by Crops.

To (1) determine moisture properties of Iowa soils (moisture holding capacity, wilting point, available soil moisture), (2) determine evapo-transpiration of different major crop covers on different soils under different weather conditions (particularly on corn), (3) investigate rate of replenishment of soil & subsoil moisture in relation to climate-crop factors, rainfall, evapo-transpiration, runoff, crop cover & mulch, (4) develop a technique for estimating soil moisture over large areas from meteorological data & from limited soil moisture samples, (5) determine optimum soil moisture range for crop growth at different growth periods, under different air temperature conditions, (6) obtain moisture data at specific locations & times, for use in agronomic interpretations, & (7) determine root distribution & development under different subsoil moisture conditions.

Agron. 1276. Coop. ARS, WB.

La.

Minor Elements in Soils.

Evaluate minor elements content of major soil types by chemical & biological methods. Learn crop responses to minor element fertilization of soils & relationship & balance required between a given minor element & any of other nutritive elements or combination of elements. Evaluate merits of various minor element carriers on soils of varying physical & chemical properties. Study effects of varying levels of available minor elements on growth & quality of crops as interpreted by chemical assays. Study chemical behavior of minor elements, as affected by type of clay minerals, per cent saturation & complementary ions.

Agron., Pl. Physiol. 878.

Maine

Effect of Fertilizers, Liming & Cultural Treatments on Crops

for Processing. To (1) further study amounts & ratios of fertilizer needed to produce large yields of high quality processing crops; (2) further study amounts of liming materials needed to maintain given pH & calcium levels in soil without increasing incidence of potato scab, & effect of these different levels on yields; (3) determine most efficient placement of small amounts of lime & effect on yields; (4) study most efficient placement of fertilizer & proper time of application in rotation; (5) determine best seeding rates for peas, sweet corn & beans, & proper spacing of broccoli plants commensurate with highest yields of processing materials; (6) study effects of side-dressing applications with N at various times upon

growth & quality of beans, sweet corn & broccoli; (7) study & improve planting, cultivation & harvesting practices for processing crops; (8) determine adaptability of new varieties for processing in Maine; (9) study effects of growth regulators & nutrient sprays on maturation & fruit-setting in beans & peas; (10) evaluate effect of harvest date on yield & quality of beans & peas; (11) determine if early removal of primary head of broccoli can be done without reducing yield; & (12) study effect of field freezing on broccoli quality.

Hort., Agron. 25.

- N. C. Soil Fertility in Relation to Soybean Growth & Production.
To (1) determine relative importance & contributions of native soil fertility, other properties of entire root zone & supplementary plant nutrients to growth & fruiting of soybeans; & (2) study relationships between soil & environmental conditions & crop in soybean growing areas of North Carolina with special reference to factors which are limiting yields.

Agron. 30.

- N. C. The Development of the Root System of Plants as Influenced by the Environment. To (1) characterize root systems of agriculturally important species & their varieties in order to determine certain aspects that may be used to differentiate their adaptation; (2) determine change in root distribution that may occur due to differences in soil properties & management practices; & (3) determine effect of any interaction that may occur within various pure & mixed plant populations.

Agron. 36.

- Ohio Factors Affecting Growth & Mineral Absorption by Plants.
1. Relative Significance of Degree of Base Saturation of the Colloidal Soil Complex & the Total Quantity of Bases Present in the Soil in the Absorption of Mineral by Plants. To evaluate the relative significance of the quantity factor or total amount of the ion present, & the intensity factor, or concentration of the ion on the exchange complex, in the absorption of minerals by plants, with particular reference to calcium, magnesium & potassium.

Agron. 36-1.

- Ohio Use of the Spectrograph for Analysis of Soil Extracts & Plant Materials. To develop spectrographic techniques for analysis of soil extracts, extracts of coal strip-mine spoil material, & plants.

Agron., For. 43.

Ohio

The Response of the Peach to Different Cultural Practices, & Rates of Nitrogen Fertilization as Indicated by Growth, Yield, Quality of Fruit, & Mineral Composition of the Foliage. To determine (1) systems of culture best adapted to establishment of peach orchards on old orchard sites; (2) effect of mulch upon nutritional status of tree with particular reference to fruit quality; (3) relation of nutrient content of foliage to quantity & quality of fruit produced; & (4) practicability of rapid methods of determining soluble nutrient content of leaf tissue as guide for fertilizer recommendations for peach.

Hort. 73.

Oreg.

Soil Structure: Its Alteration, Influence on Plant Growth & Measurement. To (1) test under greenhouse & field conditions, certain practices & amendments to obtain effects on plant growth, yield & soil properties; (2) evaluate immediate & lasting effects of certain soil amendments on structure of different soils under laboratory conditions; & (3) improve existing methods or develop new methods of evaluating soil structure.

Soils 137. W-30.

W. Va.

The Interrelation of Soil Fertility, Planting Rate & Geometry of Spacing in Relation to Yield of Various Hybrid Corn Varieties. To (1) determine optimum population & spacing of various corn varieties at different fertility rates; & (2) correlate effect of rate of planting & plant spacing with observed plant characteristics which include ear size, shelling percentage, stalk barrenness, lodging & nutrient uptake.

Agron., Gen. 58.

Physiological Genetics

Md.

Sweet Potato Breeding & Selection with Particular Reference to Quality & Resistance to Cracking. Develop varieties having resistance to cracking, incorporated with high quality of marketable roots before & after storage. Selections will be made with consideration of other characteristics required for commercial acceptability for fresh market & for processing.

Hort., Pl. Physiol. Q-81-B.

Mass.

Irradiation of Conifers. To develop superior trees for purposes of forestry or ornamental horticulture by means of radiation-induced mutations.

For. 1032.

Miss.

Testing, Selecting & Breeding Collards, & a New Study of Factors Associated with the Flowering Response. To (1) test available varieties for uniformity in plant type & productivity; (2) develop uniform type adapted to home & market use; & (3) study influence of photoperiod, light intensity, temperature & growth regulators on inducing & inhibiting flowering response.

Hort., Pl. Physiol. FK-14. Coop. USDA.

- Mo. Physiological Mechanisms of Reproduction of Horticultural Plants. To (1) make intensive investigations & evaluation of effects of major anti-auxins & one or two best known auxins on flower bud initiation & development of tomatoes, beans, peas & possibly other horticultural plants, & secure desirable set & yield of fruit after flower bud initiation & development has been achieved; & (2) determine effect of various synthetic plant growth regulators on fruit set, size & quality.
Hort. 129.
- Okla. Exploratory Studies in Radiations & Radiochemistry in Small Grains. To (1) determine validity of use of ultra-violet light in varietal testing of small grains; (2) use radiant energy sources to aid in production of insect, disease & low temperature resistant varieties; & (3) explore uses of radioisotopes as energy sources & as tracers in small grains research.
Bot., Pl. Physiol., Agron. 861.
- Pa. Physiological & Nutritional Investigations of Corn & Other Crop Plants. To (1) develop tests to characterize fundamental interplant difference to aid in selection of inbreds, varieties or species for specific conditions, & in management of crops for production; & (2) evaluate inbred, varietal & species differences in nutritional & water needs.
Agron. 1238. Coop. SWCRB.
- Tex. Inheritance of Sorghum. To (1) learn inheritance of characters in sorghum & their linkage relations as basis for further crop improvement; (2) learn nature & inheritance of certain physiological reactions in sorghum such as those to temperature & photoperiod & evaluate effect of reactions on adaptation of varieties; (3) learn role of certain physiological reactions in expression of heterosis in sorghum; (4) classify varieties & strains for genes important in choice of parents for breeding programs & for use in sorghum hybrids; & (5) make cytogenetic & genetic studies on mechanisms of sterility & relations of perennial to annual legumes.
Agron. 498. Coop. FCRB.
- Tex. Improvement of Bramble Fruits for Texas. Breed & test varieties of bramble fruits adapted to home & commerce. Study pathological & physiological diseases of same, with reference to sterility factor of Lawton variety, to learn causes & control methods. Study chemical weed control & methods of application with brambles.
Hort., Pl. Physiol., Pl. Path. 1030.

Wash.

Induction of Genetic Variability in Barley by Ionizing Radiations. To (1) use ionizing radiations to induce beneficial agronomic mutations to barley; (2) use ionizing radiations to increase genetic recombinations, i.e., increase crossing-over & break "tight" linkages; & (3) study other possible ways in which ionizing radiations may be a useful tool in barley improvement.

Agron. 1233.

Effect of Pesticides

Fla.

Effects of Biocidal Materials on the Physiology of Plants.

To correlate metabolic shifts with morphological changes in plants produced as the result of the application of additives such as herbicides; fungicides, & insecticides.

Hort., Ent. 728.

La.

The Effect of Chemicals Used in Agriculture on the Soil

Microflora. To determine effects of herbicides, pesticides, defoliants, etc., upon the microorganisms present in the soils of Louisiana.

Bot., Bact., Pl. Physiol. 837.

Miss.

Phytotoxicity of Insecticides. To determine toxicity of certain chlorinated hydrocarbons, formulated for insecticidal use, upon growth & quality of vegetable crops grown on same plots for several years & sprayed with recommended strengths of the materials.

Chem. FF-2, Hort. FK-11. Coop. USDA.

REGIONAL PROJECTS

NC-10

Factors Affecting the Germination of Weed Seeds. 1. Quackgrass Control. To devise & improve means of controlling & eradicating quackgrass with maximum efficiency & minimum injury or residual effects on soils, desirable plants, animals & man. 2. Johnson Grass Control. a. To obtain the life history of Johnson grass under the conditions prevailing in the area. b. To determine the effects of cultural practices on Johnson grass. c. To determine the effects of cropping systems & competitive crops on Johnson grass. d. To determine the effects of herbicides on Johnson grass. 3. Factors Affecting the Germination of Weed Seeds. To determine the physiological characteristics of dormancy in weed seeds & to develop methods of weed control based upon information obtained. 4. Factors Influencing Activity of Vegetative Buds in Weedy Plants. To determine more exactly the mechanisms regulating vegetative bud activity in plants & to develop methods for controlling plant growth by this means.

Cooperating stations: Federal-grant projects - Alaska, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota and Wisconsin.

NE-22

Soil-Plant-Water Relationships as a Basis for Irrigation.

1. To study water supplies for irrigation, including the development of sources & evaluation of quality. 2. To formulate a practical system for determining when & how much to irrigate, employing consumptive use, weather records & soil moisture measurements. 3. To determine the equipment requirements & performance based on crop needs & soil properties; & supplemental uses of irrigation equipment. 4. To measure crop response to irrigation in terms of yield & quality as influenced by the interaction of irrigation with other cultural practices.

Cooperating stations: Federal-grant projects - Connecticut (New Haven & Storrs), Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York (Cornell & Geneva), Pennsylvania, Rhode Island, Vermont & West Virginia.

S-12

Production & Evaluation of Forage Crops & Pastures in the South. 1. To develop more effective & efficient methods for determining the forage values of varieties & species of Southern pasture & forage plants grown singly & in combination under Southern conditions. (Subproject 1) 2. To determine basic genetics & breeding behavior of forage species & to develop & evaluate new & improved varieties & species adapted to the Southern region. (Subproject 2) 3. To determine the influence

of specific environmental factors on the behavior of various strains, varieties & species of Southern forage crops & to determine the response of these plants to variations in environments encountered in the region & to soil & grazing management & fertilization practices. (Subproject 3) 4. To develop improved methods of producing, harvesting, processing & storing seed of Southern forage crops. (Subproject 4)

Cooperating stations: Federal-grant projects - Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, Puerto Rico, South Carolina, Tennessee, Texas and Virginia.

- S-22 Pesticide Residues - Determinations; Sampling, Effects on Plants & Soils. 1. Standardization & application of chemical and/or biological methods of pesticide residue analysis. (Subproject A) 2. Standardization & application of field sampling procedures used in pesticide residue analysis. (Subproject B) 3. Evaluation of the effects of pesticide residues on plant growth, plant products & soil. (Subproject C)

Cooperating stations: Federal-grant projects - Arkansas, Florida, North Carolina, Puerto Rico and South Carolina.

- W-23 Physiological & Environmental Factors Affecting the Establishment & Production of Forage Crops. To assess forage species & varieties or strains for their relative potentialities in production of seed & their utilization as forage crops in the eleven Western states & Hawaii.

Cooperating stations: Federal-grant projects - Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming.

- W-29 Soil-Water-Plant Relationships Under Irrigation. 1. To evaluate the influence of different systems of water management on plant growth & on soil in relation to fertilization, salinity & cropping practices. 2. To determine the relation of soil moisture conditions to nutrient uptake, physiological responses & plant growth. 3. To study the soil water system including soil moisture energy relations, water retention characteristics & the principles involved in infiltration, unsaturated flow & vapor transfer. 4. To improve techniques & instruments to measure soil moisture. 5. To investigate the factors affecting the rate of water use by crops.

Cooperating stations: Federal-grant projects - California, Colorado, Montana, Oregon, Utah, Washington and Wyoming.

Measurement, Evaluation & Modification of Soil Structure.

1. To develop & test direct or indirect laboratory & field methods & techniques for characterizing, measuring & evaluating soil structure.
2. To investigate the interdependence of static & transitory structure with the edaphic factors: soil moisture, aeration, resistance to penetration & temperature.
3. To determine the effect of chemical properties of soil on structure.
4. To evaluate the interrelationships of natural & synthetic soil amendments & soil structure.
5. To investigate the effect of tillage & other mechanical forces on soil structure.
6. To apply promising methods & techniques to the practical evaluation of soil structure & its changes as related to plant growth & soil & water conservation.

Cooperating stations: Federal-grant projects - Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming.

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LIST OF SUMMARIES OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

SESD-OD-1103 : Summary : Number :	Subject-Matter Area :	Title of Summary :
1	Agricultural Chemistry <u>2</u> /	Agricultural Chemistry
2	Agricultural Economics <u>2</u> /	a. Prices & Incomes & General Studies of Commodities or Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering <u>1</u> /	a. Land & Water Use & Development b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Industry <u>1</u> /	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry <u>1</u> /	Dairy Cattle
6	Dairy Technology <u>1</u> /	Dairy Technology
7	Entomology & Economic Zoology <u>1</u> /	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops <u>1</u> /	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology <u>1</u> /	Food Science & Technology (Secs. a, b and c)
10	Forage Crops, Pastures & Ranges <u>1</u> /	Forage Crops, Pastures & Ranges
11	Forestry <u>1</u> /	Forestry
12	Fruits & Nuts <u>2</u> /	Fruits & Nuts
13	Home Economics	<u>1</u> / a. Human Nutrition <u>1</u> / b. Housing <u>2</u> / c. Foods <u>2</u> / d. Household Economics & Equipment

1/ Summary Available

2/ Summary will be available by February 1, 1957

SESD-OD-1103 Summary Number	:	Subject Matter Area	:	Title of Summary
14		Economics of Marketing <u>2/</u>		a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15		Meteorology <u>1/</u>		Meteorology
16		Ornamental & Drug Plants <u>2/</u>		Ornamental & Drug Plants
17		Plant Pathology & Bacteriology <u>1/</u>		a. Plant Pathology & Botany b. Diseases of Field Crops c. Diseases of Fruit Crops
13		Plant Physiology & Nutrition <u>1/</u>		Plant Physiology & Nutrition
19		Poultry Industry <u>2/</u>		Poultry Industry
20		Rural Sociology <u>1/</u>		Rural Life Studies
21		Soils & Fertilizers <u>1/</u>		Soils & Fertilizers
22		Vegetables <u>1/</u>		a. Vegetable Crops b. Potatoes
23		Veterinary Science <u>1/</u>		Veterinary Science
24		Weeds <u>1/</u>		Weed Control

1/ Summary Available

2/ Summary will be available by February 1, 1957